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OHIO STATE UNIVERSITY
BULLETIN

VOLUME XXX MARCH 13, 1926 NUMBER 18

GRADUATE SCHOOL

1926-1927

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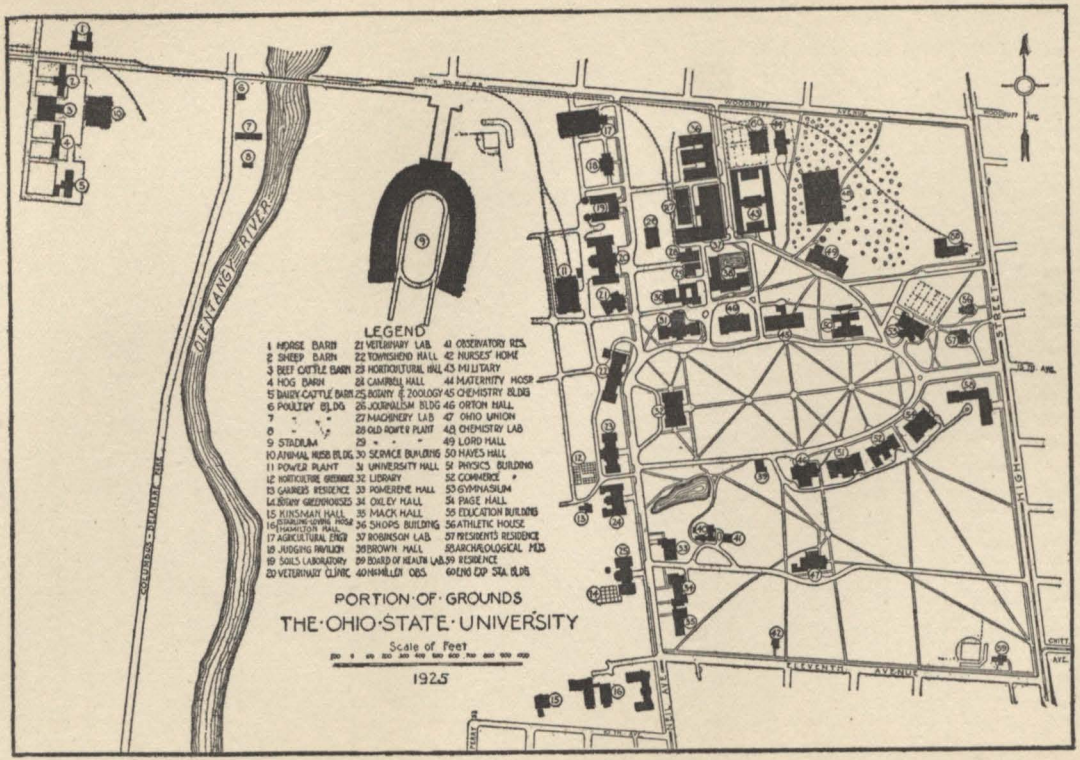
OLENTANGY RIVER
LEGEND
1 HORSE BARN
2 SHEEP BARN
3 BEEF CATTLE BARN
4 HOG BARN
5 DAIRY CATTLE BARN
6 POULTRY BLDG
7
8
9 STADIUM
10 ANIMAL HUSB. BLDG.
11 POWER PLANT
12 HORTICULTURE GREENHSE
13 GARNER'S RESIDENCE
14 BOTANY GREENHOUSES
15 KINSMAN HALL
16 DRAKE GYMN. ANNEX (HAMILTON HALL)
17 AGRICULTURAL ENGR
18 JUDGING PAVILION
19 SOILS LABORATORY
20 VETERINARY CLINIC
21 VETERINARY LAB.
22 TOWNSHEND HALL
23 HORTICULTURAL HALL
24 CAMPBELL HALL
25 BOTANY & ZOOLOGY
26 JOURNALISM BLDG
27 MACHINERY LAB
28 OLD POWER PLANT
29
30 SERVICE BUILDING
31 UNIVERSITY HALL
32 LIBRARY
33 POMERENE HALL
34 ORLEY HALL
35 MACK HALL
36 SHOPS BUILDING
37 ROBINSON LAB.
38 BROWN HALL
39 BOARD OF HEALTH LAB.
40 McMILLEN OBS.
41 OBSERVATORY RES.
42 NURSES' HOME
43 MILITARY
44 MATERNITY HOSP
45 CHEMISTRY BLDG
46 ORTON HALL
47 OHIO UNION
48 CHEMISTRY LAB
49 LORD HALL
50 HAYES HALL
51 PHYSICS BUILDING
52 COMMERCE
53 GYMNASIUM
54 PAGE HALL
55 EDUCATION BUILDING
56 ATHLETIC HOUSE
57 PRESIDENT'S RESIDENCE
58 ARCHAEOLOGICAL MUS
59 RESIDENCE
60 ENG EXP STA. BLDG
PORTION OF GROUNDS
THE OHIO STATE UNIVERSITY
Scale of Feet
1925
NORTH HIGH
WOODRUFF AVE.
CHITTY AVE.
PRESIDENTIAL AVENUE

CONTENTS

CALENDAR FOR 1926

JANUARY.

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

FEBRUARY.

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

MARCH.

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

APRIL.

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

MAY.

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

JUNE.

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

JULY.

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

AUGUST.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

SEPTEMBER.

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

OCTOBER.

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

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S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
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21	22	23	24	25	26	27
28	29	30				

DECEMBER.

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

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JANUARY.

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

FEBRUARY.

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
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		1	2	3	4	5
6	7	8	9	10	11	12
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20	21	22	23	24	25	26
27	28	29	30	31		

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S	M	T	W	T	F	S
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10	11	12	13	14	15	16
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10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

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S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
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28	29	30	31			

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S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
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2	3	4	5	6	7	8
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

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		1	2	3	4	5
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13	14	15	16	17	18	19
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27	28	29	30			

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4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

UNIVERSITY CALENDAR

SUMMER QUARTER 1926

June 7 to 11	Entrance Examinations.
June 14 to 18	Physical Examinations for all new students.
June 16	Latest day for registration and payment of fees without penalty. (See page 18.)
June 17	Classes begin, 7:30 A. M.
June 19	Intelligence Test for all new students (Saturday A. M.).
July 4	Independence Day.
July 22, 23, 24	Final Examinations, first term (at regular class hours).
July 23, 24	Physical Examinations for all new students.
July 24	First Term ends, 5:30 P. M.
July 26	Second Term begins, 7:30 A. M.
July 31	Intelligence Test for all new students.
August 26, 27, 28	Final Examinations, second term (at regular class hours).
August 27	Summer Convocation (Commencement), 2:00 P. M.
August 28	Summer Quarter ends, 6:00 P. M.

AUTUMN QUARTER

September 20 to 24	Entrance Examinations.
September 23 to October 1	Physical Examinations for all new students.
September 27	Latest day for registration and payment of fees without penalty. (See page 18.)
September 28	Classes begin, 8:00 A. M.
September 29	President's Annual Address, 11:00 A. M.
October 2	Intelligence Test for all new students (Saturday A. M.).
November 11	Armistice Day. Ceremonial Exercises, 10 A. M. to 12 M.
November 25, 26, 27	Thanksgiving Recess.
December 18, 20, 21, 22	Final Examinations.
December 22	Autumn Convocation (Commencement), 2:00 P. M.
December 22	Autumn Quarter ends, 6:00 P. M.

WINTER QUARTER 1927

January 3 to 8	Physical Examinations for all new students.
January 3	Latest day for registration and payment of fees without penalty. (See page 18.)
January 4	Classes begin, 8:00 A. M.
January 8	Intelligence Test for all new students (Saturday A. M.).
February 22	University Day. No classes.
March 16, 17, 18, 19	Final Examinations.
March 18	Winter Convocation (Commencement), 2:00 P. M.
March 19	Winter Quarter ends, 6:00 P. M.

SPRING QUARTER

March 28 to April 1	Physical Examinations for all new students.
March 28	Latest day for registration and payment of fees without penalty. (See page 18.)
March 29	Classes begin, 8:00 A. M.
April 2	Intelligence Test for all new students (Saturday A. M.)
May 14	Competitive Drill, Cadet Regiments.
May 30	Memorial Day. No classes.
June 8, 9, 10, 11	Final Examinations.
June 11	Alumni Day.
June 12	Baccalaureate Sermon.
June 13	Class Day.
June 14	Spring Convocation (Commencement), 10:00 A. M.
June 14	Spring Quarter ends, 12:00 M.
June 15 to August 27	Summer Quarter.
September 26 to December 21	Autumn Quarter.

ADMINISTRATION

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ALMA WACKER PATERSON.....Columbus
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JULIUS F. STONE.....Columbus
HARRY A. CATON.....Coshocton

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Residence: 262 Nineteenth Ave.—11086

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Office: Administration Building—99332; UN-0032
Residence: 198 West Eleventh Ave.—5835

Registrar, University Editor, and Secretary of the University Faculty.....
.....EDITH D. COCKINS
Office: Administration Building—99314
Residence: 1348 Neil Ave.—16310

University Examiner.....BLAND L. STRADLEY
Office: Administration Building—99353; UN-0939
Residence: 43 West Patterson Ave.—UN-6960-W

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Residence: 265 Tulane Rd.—UN-2240-J

Cashier.....FLORIS D. HANE
Office: Administration Building—99371, two rings; UN-0032
Residence: 373 Thirteenth Ave.—11954

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Residence: 304 West Ninth Ave.—UN-5546

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Office and Residence: Mack Hall—99352; UN-5820; UN-5821

Manager of Ohio Union.....EDWARD S. DRAKE
Office and Residence: Ohio Union—99359, one ring; UN-3270

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Office: Pomerene Hall—UN-2402-J
Residence: 1332 Hunter Ave.—16258

Director of Student Health Service.....H. SHINDLE WINGERT
Office: 101 Hayes Hall—99393
Residence: 22 Twelfth Ave.—11883

Chief Engineer and Superintendent of Buildings and Grounds.....WILLIAM C. McCRACKEN
Office: Service Building—99370; UN-0718
Residence: 8 West Woodruff Ave.—11823

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Office: 100 Brown Hall—99361
Residence: 55 East Oakland Ave.—14844

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Residence: 1828 Arlington Ave.—UN-0918-W

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Residence: 255 Oakland Park Ave.—UN-7024-W

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Office: Administration Building—99353; UN-0939

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Secretary.....EDITH D. COCKINS
Office: Administration Building—99314

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Residence: 459 West Eighth Ave.—16602

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Office: Education Building—99397; UN-2885
Residence: 195 West Eleventh Ave.—16531

Division of Appointments

Director.....JOHN L. CLIFTON
Office: Education Building—UN-8662-W
Residence: 1852 Summit St.—12017; UN-3242-W

THE GRADUATE SCHOOL

Dean.....WILLIAM McPHERSON
Office: 106 University Hall—99399
Residence: 198 Sixteenth Ave.—11279

THE GRADUATE COUNCIL

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WILLIAM MORTON BARROWS, S.D., Professor of Zoology and Entomology
FIRMAN EDWARD BEAR, Ph.D., Professor of Soils
LEONARD BLOOMFIELD, Ph.D., Professor of German and Linguistics
HAROLD ERNEST BURTT, Ph.D., Professor of Psychology
FRANCIS WILLIAM COKER, Ph.D., Professor of Political Science
WILLIAM LLOYD EVANS, Ph.D., Professor of Chemistry
FREDERICK E. LUMLEY, Ph.D., Professor of Sociology
FRANKLIN WALES M'ARQUIS, M.E., Professor of Steam Engineering
J. CAYCE MORRISON, Ph.D., Professor of School Administration
CLAYTON SIDNEY SMITH, Ph.D., Professor of Physiological Chemistry, Pharmacology and Materia Medica
ALBERT BENEDICT WOLFE, Ph.D., Professor of Economics
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REPRESENTING MIAMI UNIVERSITY

HARVEY C. BRILL, Ph.D., Professor of Chemistry, Miami University

FELLOWS AND SCHOLARS

1925 - 1926

duPONT de NEMOURS FELLOW

LLOYD CLAYTON SWALLEN.....Chemistry

GRASSELLI FELLOW

HENRY CLYDE CARLTON.....Chemistry

ROBINSON FELLOW

ALBERT WARD ROSS, JR.....Civil Engineering

CHARLES A. COFFIN FELLOW

LESTER HERMAN COLBERT.....Physics

NATIONAL LIME ASSOCIATION FELLOW

SAMUEL SHENKER.....Chemical Engineering

NATIONAL LIMESTONE ASSOCIATION FELLOW

HERBERT FRICK KRIEGE.....Soils

BUREAU OF MINES FELLOWS

HENRY GRUNSKY FISK.....Mineralogy
RALPH JAMES PADDOCK.....Mineralogy
HAROLD ELLIS SIMPSON.....Ceramics

Y. M. C. A. FELLOWS

REX MARVIN JOHNSON.....Sociology
WILLIAM LINVILLE LOUDON.....Sociology

UNIVERSITY FELLOWS

HARRY WILLIS ALLEN.....Entomology
RAYMOND LANSON CARTER.....School Administration
FRANCIS HERRICK CONNERS.....School Administration
WILLIAM ALFRED EVERHART.....Inorganic Chemistry
TOH LIU.....Chemical Engineering
REGINALD HENRY PAINTER.....Entomology
RAYMOND EUGENE SCHAAD.....Organic Chemistry

UNIVERSITY SCHOLARS

FREDERICK CALVIN AULT.....Political Science
EDWIN JACOB BOGNAR.....Geology
EDWARD DOUGLAS BRANCH.....American History
MARY MARTHA CARTER.....Anatomy
BEULAH BELLE CLARK.....Principles of Education
DOROTHY LOUISE DUIS.....Spanish
MARTIN FERDINAND EDWARD GAUDIAN.....Economics
GEORGE LEASE GLAUNER.....American History
AGNES HOWARD GRANT.....Agricultural Chemistry
WILLIS HERBERT HALL.....American History
ROBERT FRANKLIN HEALD.....Chemical Engineering
JAMES EDWIN HUTCHMAN.....Organic Chemistry
CLIFFORD L. JAMES.....Sociology
GERTRUDE LAWRENCE.....European History
CHIH TAI LI.....Political Science
PEDRO TAMESIS ORATA.....Principles of Education
WILLIAM DANIEL OVERMAN.....History of Education
RALPH JOSEPH SLATTERY.....Philosophy
GERTRUDE AUSTIN PAVEY.....Psychology
MARGARET THOMAS.....American History
Y. CHARLES LING WU.....Sociology

THE OHIO STATE UNIVERSITY

The Ohio State University is situated within the corporate limits of the City of Columbus. It is supported by appropriations from the State and Federal governments. The campus and farm cover 1,100 acres. The campus proper contains 300 acres. The total value of land, buildings, and equipment is $12,493,084.40.

ORGANIZATION

For convenience of administration the departments of the University are grouped into organizations called Colleges. The Ohio State University comprises ten Colleges and a Graduate School, each under the administration of a Dean and College Faculty, as follows:

Graduate School
College of Agriculture
College of Arts, Philosophy, and Science
College of Commerce and Journalism
College of Dentistry
College of Education
College of Engineering
College of Law
College of Medicine
College of Pharmacy
College of Veterinary Medicine

THE UNIVERSITY YEAR—FOUR QUARTERS

The University year is divided into four Quarters, each approximately twelve weeks in length. The Summer Quarter is further divided into two terms of approximately six weeks each. Complete courses that are so announced may be taken for either term or for the entire Quarter.

Nearly all of the elementary courses are five hours each week. A number of more advanced courses are two or three hours each week. The schedule is so arranged that a student who is registered in the Graduate School, or in a College where the work is largely elective, may enter at the beginning of any Quarter and may, without hardship, be absent during any Quarter. For the most part students will take one Quarter each year as a vacation period—usually the Summer Quarter. By attendance in all four Quarters the duration of the time of residence for a degree may be shortened. Many persons, particularly teachers, avail themselves of the advantages offered in the Summer Quarter.

This *Bulletin* is devoted to the work of the Graduate School for the Autumn, Winter, and Spring Quarters, 1926-1927. The announcements for the Summer Quarter are printed in the Summer Quarter Bulletin.

NOTE: Bulletins describing the work of the several Colleges may be obtained by addressing the University Examiner, The Ohio State University, Columbus, Ohio, and stating the College in which the writer is interested. (For list of bulletins, see cover page 3.)

THE GRADUATE SCHOOL

GENERAL INFORMATION

The offices of the President of the University, the University Examiner, the Registrar, and the Bursar are located in the Administration Building.

The office of the Graduate School is located in Room 106, University Hall, on the west side of the Campus, on Neil Avenue. The office is open from 8:00 a. m. to 12 m. and 2:00 to 5:00 p. m. daily, except Saturday. On Saturday, it is open from 8:00 a. m. to 12:00 m.

ORGANIZATION AND ADMINISTRATION

The instruction and training of graduate students has been one of the functions of the Ohio State University since 1878, when the first graduate student was in residence. For a number of years the graduate work of the University was unorganized and each department conducted its own work with little reference to that of other departments. After the University was divided into colleges, each college controlled the graduate work offered in the various departments constituting that college. In 1902, however, the graduate work within the College of Arts, Philosophy, and Science had assumed sufficient proportions to warrant the organization of a Graduate School to secure an effective and systematic arrangement of the graduate work of that college. Finally in 1911, there was organized the Graduate School of the University to administer all the graduate work offered in the several departments of the University. This school is under the administration of a Graduate Council consisting of the Dean and fourteen members, twelve of whom are appointed from among those offering graduate work in the Ohio State University and one each from the faculties of Ohio University and Miami University. This council reports directly to the University Faculty, which is the legislative body of the Graduate School, as well as of the ten colleges.

It is the custom of the University to endeavor to secure from time to time representative scholars who are members of the faculties of Ohio colleges to give graduate courses in the University. By action of the Board of Trustees of the University such scholars, during the year in which this service is rendered, are eligible to membership in the Graduate Council, the membership of which is increased to permit of such appointments.

All communications and inquiries regarding matters connected with the Graduate School, whether from prospective students or from those whose work is in progress, should be directed to the Dean of the Graduate School.

AGREEMENTS BETWEEN THE OHIO STATE UNIVERSITY AND OTHER STATE-SUPPORTED INSTITUTIONS BEARING ON GRADUATE WORK

In order that the facilities of certain institutions of the State of Ohio may be utilized for the pursuit of research work in connection with the Graduate School of the University, certain agreements have been made between the Board of Trustees of the Ohio State University and similar boards of Ohio University, of Miami University, and of the Ohio Experiment Station. Briefly, these agreements are as follows:

(a) **With Ohio University and Miami University.** Each of these Universities is represented upon the Graduate Council of the Ohio State University. It is agreed, however, that no graduate work will be offered by Ohio University and Miami University except that part-time assistants connected with the instructional staff of Ohio University or Miami University may pursue their graduate work for the Master's degree at these Universities, subject to the supervision of the Graduate Council of the Ohio State University, and upon the successful completion of the same will receive their degrees from Ohio State University.

(b) **With the Ohio Experiment Station.** Persons engaged in investigation at the Ohio Experiment Station may register in the Graduate School of the University and the research work carried on at the Station by such persons may be counted towards a graduate degree under appropriate restrictions. All such cases, however, shall be considered individual and subject to detailed examination on the part of the Graduate Council. It is possible for a student to complete his work for the Master's degree in residence at the Station alone. For the Doctor's degree he must spend at least one year in residence at the Ohio State University. In all cases, however, the work of the student is carried on under the general rules and regulations of the Graduate Council and the final examinations must be taken at the University in the presence of representatives of the Experiment Station Staff and of the Graduate Council.

THE UNIVERSITY LIBRARY

The University Library consists of all books owned by the University and numbers approximately 275,000 volumes. The main part of the Library, which is known as the General Library, is housed in the Library building. Very important divisions of the book collection are housed in other buildings. A catalog of the entire collection is maintained in the General Library.

Any person is privileged to use the University Library for reference, but books may be drawn only by officers and registered students of the University.

The General Library is open from 7:30 a. m. to 9:30 p. m., Monday to Friday; Saturday from 7:30 a. m. to 5:30 p. m. Vacation hours are from 8 a. m. to 5 p. m. Monday to Friday; Saturday from 8 a. m. to 12 m. The Library is closed on legal holidays.

The University Library is a depository for the official publications of the United States and has a remarkably full collection of these documents. It also receives thousands of documents from states, cities and foreign countries. The exchanges of the Ohio Academy of Science, of the Ohio State University Scientific Association, and of the Ohio Biological Survey are deposited in the University Library.

Of the department libraries five are organized divisions of the University Library, in charge of library assistants.

The Law Library is in Page Hall. It includes all of the United States and state reports, the English reports, the Irish reports, the latest statutes, codes, and session laws of the states, complete sets of all the important legal periodicals and an up-to-date collection of textbooks. It is especially well equipped for the study of Ohio law.

The Medical and Dental Library is in Hamilton Hall. This is a working collection of books, the historical books being shelved in the General Library.

Collections of books on Architecture, Engineering Drawing and Civil Engineering are located in a room in Brown Hall. This is known as the Brown Hall Library. The collection of plates, filed in this library, is especially valuable for the students in Architecture.

The Orton Memorial Library, located in Orton Hall, is one of the most complete geological libraries in the country. In addition, the Ohio Geological Survey deposits its document exchanges with the library. These two collections constitute a very complete set of official geological reports from the states, foreign governments and scientific societies.

The Charles Cutler Sharp Library is located in the Chemistry Building. It contains not only the current periodicals and a large collection of dictionaries and handbooks on chemistry but also complete sets of all important journals dealing with subjects lying within the general field of chemistry and related sciences.

The Botany and Zoology Library is located in the Botany and Zoology Building. The "Index to General Botanical Literature," the "Index to Algological Literature" and the card index of the Concilium Bibliographicum are in this departmental library.

Other departmental libraries are to be found in Lord Hall, in Robinson Laboratory, in the Commerce Building, and in the Veterinary Laboratory Building. Smaller collections are connected with many of the departments. The books relating to the Department of Fine Arts are collected in a special room known as the Art Reserve Room, where students have every facility for research.

The Library of the Ohio Archaeological and Historical Society, which is on the University Campus, is at the service of the officers and students of the University. This library is specializing in Ohio history and a very valuable collection is being built up.

TEACHERS PLACEMENT SERVICE

The Ohio State University maintains a Teachers Placement Service for the convenience of the Superintendents and Boards of Education of the State. Graduates and graduate students of the Ohio State University are invited to enroll with the Appointment Office.

The Placement Service is under the direction of the Bureau of Educational Research. This service is rendered free of charge to the applicants. Graduates of experience who desire to better their locations are invited to communicate with the Appointment Office.

The Appointment Office has available such statistical information that advice and direction may be given in the matter of supply and demand for teachers in their various fields.

The service offered will be rendered on the exact basis of merit.

Superintendents and Boards of Education are invited to state their needs to the Appointment Office. Prompt attention to all calls is assured.

REGISTRATION

REGISTRATION.—Under the Quarter Plan each student will present his program of studies for only one Quarter at a time. During each Quarter certain days will be announced during which every student in residence will be required to file his program of studies for the following Quarter. Fees may be paid as soon as fee cards have been received by the student from the Registrar. Students who have registered sufficiently early usually receive fee cards approximately three weeks prior to the opening of the Quarter. *It is to the advantage of all students to register as early as possible.*

PAYMENT OF FEES.—All fees and laboratory deposits required of a student must be paid to the Bursar before the student will be admitted to his classes.

PROCEDURE FOR REGISTRATION

NEW STUDENTS.—Registration consists of the following steps in the order indicated. *Unless the student follows these instructions in every detail his registration in the University is not complete.*

(1) The student should secure

(a) An admission card from the University Examiner. (For necessary entrance credentials see page 24.)

(b) An election card or study-program card from the Office of the Graduate School. This card must be approved by the Dean of the Graduate School and also by the Schedule Committee. (For details see page 25.)

(c) A fee card from the Registrar's Office. On this card the student will be assessed all incidental, tuition, and laboratory fees. The fee card must be presented to the Bursar when the student pays his fees. All fees must be paid before the student will be admitted to classes.

(d) A University directory card from the Registrar's Office. Each year upon entering the University every student is required to file in writing, in the Office of the Registrar, his local address and his home address on the blank provided for this purpose. He must report promptly to the Registrar's Office all subsequent changes in either address, as long as he is connected with the University.

(2) Every entering student must report for a Physical Examination upon the date of appointment mailed to the student by the University Examiner. (See page 18 for penalty.)

Men should report to the Medical Examiner for Men, at the Men's Gymnasium.

Women should report to the Medical Examiner for Women, at Pomerene Hall.

(3) Every entering student must report to the Department of Psychology for an Intelligence Test, upon the dates appointed. (See University Calendar, page 3.)

(4) Every woman student must register with the Dean of Women at her office in Pomerene Hall within twenty-four hours following her registration in the University.

STUDENTS IN CONTINUOUS RESIDENCE.—Students who have been in continuous residence in the University will proceed as follows. They should secure

(1) An election card or study-program card at the Office of the Graduate School. This card must be approved by the Dean of the Graduate School and also by the Schedule Committee.

(2) A fee card from the Registrar's Office, on which will be assessed all incidental, tuition, and laboratory fees. This card must be presented at the Bursar's Office and all fees paid before the student will be admitted to classes.

STUDENTS TRANSFERRING TO A COLLEGE IN THE UNIVERSITY.—A student who desires to transfer from the Graduate School to a college of this University must make his application for such transfer to the University Examiner. This transfer must be approved by the University Examiner before the student will be permitted to proceed with his registration in the college which he is proposing to enter.

WITHDRAWAL FROM THE UNIVERSITY

A student who desires to withdraw from the University must make application to the Dean of the Graduate School for permission to withdraw in good standing. *If the student leaves the University at any time during the Quarter, without communicating with the Dean, he will be marked as having failed in all of his courses for the Quarter.* If a personal interview is impossible, the Dean must be notified by mail. In order to retain his right to voluntary return, the reasons given for withdrawal must be satisfactory to the Dean, and must be so endorsed at the time the application is filed.

The written permission of the Dean shall be filed with the Registrar at once by the Secretary that the proper entry may be made upon the University records.

FEES AND EXPENSES

GENERAL CHARGES

All University fees must be paid at the opening of each Quarter as a condition of admission to classes. All registration fees, including laboratory deposits are assessed in the office of the Registrar and are paid in the office of the Bursar. Registration is not complete until all fees have been paid. No student will have any privileges in the classes or laboratories until all fees and deposits are paid.

Since all fees are due and payable as a part of the student's registration, no person should come to the University for registration without money sufficient to cover all of his fees and deposits.

MATRICULATION FEE

Every student upon his *first admission to the University* is required to pay a matriculation fee of $10.00 (non-returnable). This fee is paid but once and is in addition to other University fees and entitles the student to the privileges of membership in the University.

NON-RESIDENT FEE

Every student who is not a legal resident of the State of Ohio is required to pay a non-resident fee of $35.00 each Quarter (or $20.00 each term of the Summer Quarter) of his residence in the University in addition to other University fees. The burden of registering under proper residence is placed upon the student. If there is any possible question of his right to legal residence the matter should be brought to the attention of the Registrar and passed upon, previous to registration or the payment of fees. Any student who registers improperly under this rule shall be required to pay not only the non-resident fee but shall be assessed a penalty of $10.00. Students who do not pay this fee within thirty days after they have been notified that the non-resident fee has been assessed against them, will have their registration in the University cancelled.

No person shall be considered eligible to register in the University as a resident of the State of Ohio unless he has been a bona fide resident in the State twelve consecutive months next preceding the date of his original enrollment, and no person shall be considered to have gained or lost a residence in this State for the purpose of registering in the University by any conduct of his own while he is a student in the University; but persons whose legal residence follows that of other persons, as hereinafter provided, shall be considered to have gained or lost legal residence in this State for such purpose while students in the University according to changes of legal residence of such other persons, except that such legal residence shall not be considered to be so gained until

twelve months after such other person becomes a legal resident of this State.

The residence of minors shall follow that of the legal guardian, regardless of emancipation; but in case a resident of Ohio is appointed guardian of a non-resident minor, the legal residence of such minor for the purpose of this rule shall not be considered to be established in the State of Ohio until the expiration of twelve months after such appointment.

The residence of wives shall follow that of husbands.

Aliens who have taken out their first citizenship papers and who have been residents of Ohio for twelve months next preceding the date of their enrollment in the University, shall be regarded as eligible for registration as residents of Ohio.

INCIDENTAL FEE

The fee for all students is $15.00 each Quarter.

THE OHIO UNION AND THE WOMEN'S UNION

A fee of $1.00 each Quarter is paid by all students at registration. This entitles the student to all the privileges of the Unions consistent with the Constitutions and House Rules governing them.

LABORATORY DEPOSIT

Students are required to pay for all materials consumed in laboratory work. To meet the cost of these materials a deposit ranging from $1.00 to $20.00 for each course requiring such supplies is made at the time of registration before the student may enter the laboratory. All laboratory supplies are sold at the Laboratory Supply Store, Chemistry Building, to students, at cost to the University, and charged against the deposit. (See page 18.)

Instructors shall not permit students to engage in laboratory work unless first shown a receipt from the Bursar for deposits paid.

ROOM AND BOARD

Room and Board. (See Living Arrangements, page 22.)

RETURN OF FEES

Return of Fees. (See page 17.)

GRADUATION FEE

A special graduation fee is required of each person receiving a diploma from the University. This fee must be paid thirty days *before* the close of the Quarter in which the candidate expects to receive his degree. Failure to comply with this rule involves a penalty of $5.00. (See page 18.)

The fee for a master's degree is $10.00.

The fee for a doctor's degree is $10.00.

FEES FOR INSTRUCTORS, GRADUATE ASSISTANTS, FELLOWS, SCHOLARS, AND GRADUATE NURSES

The following persons shall be exempt from all fees except a diploma fee of $10.00, and a matriculation fee of $10.00 (unless the latter fee has already been paid as an undergraduate fee), and the exemption shall include laboratory supplies:

All members of the instructional force of the University, including Graduate Assistants, who are registered in the Graduate School of the University.

All persons holding Fellowships or Scholarships and registered in the Graduate School.

All instructors registered as students in any College of the University who have obtained their baccalaureate degree.

All graduate nurses giving instruction in the classes in Public Health Nursing.

All trained nurses employed in the Hospital of the College of Medicine.

The total credit hours for courses carried in any one Quarter by a member of the instructional force, engaged at the same time in teaching, shall not exceed one-half of the total permitted to full-time students.

REFUND ON FEES

If a student is forced to discontinue his connection with the University or to withdraw from a laboratory course during a Quarter, he must first secure permission from the Dean. On presentation of this permission the following refund of fees will be made:

On Tuition Fees. On application to the Bursar a refund will be made on tuition fees for students who withdraw during the first thirty days of the Quarter.

Such refunds will not be made until thirty days after the date of withdrawal. In no case shall more than one-half of the fee be refunded.

Fees are not returnable except in case of sickness and causes entirely beyond the control of the student. No portion of the fees shall be returned for voluntary or enforced withdrawal of the student after the first thirty days of the Quarter.

Students withdrawing under discipline forfeit all rights to the return of any portion of the fees.

On Laboratory Deposits. No portion of a laboratory deposit of $5.00 or less shall be returned, unless the course is officially dropped by the student within thirty days after the payment of the deposit.

On laboratory deposits of $6.00 or more the unexpended portion of the deposit is returnable if called for on or before the June Commencement of the fiscal year in which the student has made the deposit.

An order for refund for the unexpended portion of the deposit may be obtained on application at the Laboratory Supply Store, Chemistry Building. The refund will be paid at the Bursar's Office on presenting the order for the same.

SPECIAL FEES—PENALTIES

FEE FOR LATE PAYMENT OF FEES

All fees shall be paid by the close of the day preceding the first day of recitations. Failure to comply with this rule involves a penalty of $5.00 for every succeeding day or fraction thereof, except in the case of a graduate student or a new student granted late registration by the Executive Committee.

A graduate student, or a new student granted late registration, shall pay his fees within twenty-four hours of the date of his registration as certified by his Dean or Secretary, or the penalty will be imposed.

FEE FOR DUPLICATE FEE RECEIPT

A duplicate receipt for fees will be issued only upon presentation of satisfactory evidence of the loss or destruction of the original. A fee of $1.00 will be charged for each duplicate receipt.

FEE FOR FAILURE TO KEEP APPOINTMENT FOR PHYSICAL EXAMINATION

A fee of $1.00 will be assessed for failure to keep appointment for Physical Examination or for change in date of Physical Examination.

FEE FOR RE-REGISTRATION

When checks given for payment of fees are not paid on presentation at bank, registration will be cancelled and receipts given considered null and void. A penalty of $5.00 will be charged for re-registration.

FEE FOR LATE PAYMENT OF GRADUATION FEE

A special graduation fee is required of each person receiving a diploma from the University. This fee must be paid thirty days *before* the close of the Quarter in which the candidate expects to receive his degree. (See page 17.)

Failure to comply with this rule involves a penalty of $5.00.

ASSISTANTSHIPS AND SCHOLARSHIPS

GRADUATE ASSISTANTSHIPS OPEN TO GRADUATE STUDENTS

In order to encourage graduates of this University and of other similar and approved institutions, especially those in Ohio, to continue their studies and to pursue advanced work leading to the higher degrees, the University has established graduate assistantships in several departments. Graduate Assistants are elected for the year (four Quarters). During three Quarters, generally the Autumn, Winter, and Spring Quarters, they must devote not to exceed one-half of their time to assisting in the work of the department in which they are pursuing their major work; during the remaining Quarter the Graduate Assistants are free to carry on their work at the University or elsewhere. Each Graduate Assistant must confer with the head of the department in which he is doing his major work concerning the Quarters that he must be in residence. A Graduate Assistant receives a stipend of $500, payable in nine monthly installments during the three Quarters in which he is rendering service. In addition, all fees are remitted except a matriculation fee of $10.00 in case the Assistant has never attended the University and a diploma fee of $10.00 in case the Assistant receives a degree.

Students desiring to apply for graduate assistantships in any academic year must present their applications not later than March 1st of the preceding year. Application blanks may be obtained upon request by addressing the Dean of the Graduate School. The appointments to graduate assistantships are made annually in April or May.

SCHOLARSHIPS AND FELLOWSHIPS

In addition to the graduate assistantships, a limited number of scholarships and fellowships have also been established. The scholarships are open to students having a baccalaureate degree from an approved institution, and have a value of $300 with exemption from all fees, except the matriculation fee and a diploma fee ($10.00 each). The fellowships, on the other hand, are open only to students who have at least the Master's degree or its equivalent, and have a value of $500 with like exemption from all fees, except the matriculation fee and a diploma fee ($10.00 each). Scholars and Fellows are selected on a basis of merit and must devote all their time to graduate work, including research. They are elected for the year, four Quarters, but are required to be in attendance only three Quarters, generally the Autumn, Winter, and Spring Quarters, during the year. Candidates for these positions must file their applications not later than March 1st. Application blanks may be obtained by addressing the Dean of the Graduate School.

FELLOWSHIPS

THE STILLMAN W. ROBINSON FELLOWSHIP

This fellowship endowed by Stillman W. Robinson, late Professor of Mechanical Engineering, for the encouragement of graduate research in engineering, has a value of $750 annually, and is open to graduates in mechanical, civil, and electrical engineering.

The holder of this fellowship must devote his entire time to graduate work. This should lead to the Master's or the Doctor's degree under the general regulations which obtain in reference to these degrees. For further information or for application blanks address the Dean of the Graduate School or the Secretary of the College of Engineering.

All applications should be filed with the Dean of the Graduate School not later than March 1st.

THE E. I. duPONT de NEMOURS FELLOWSHIP

Through the generosity of E. I. duPont de Nemours & Company of Wilmington, Delaware, and in recognition of the services of colleges and universities in training chemists for the emergency of the War, fellowships in chemistry have been established in a number of institutions, one of which is available at the Ohio State University.

The holder of the fellowship must be prepared to engage at once in active research upon a problem distinctly chemical in character, there being no further limitations upon the fellowship. The stipend is $750 per annum, and it is expected that at the conclusion of the period the holder of the fellowship will be able to present his research as a thesis for the degree of Doctor of Philosophy. For further information or for application blanks address the Dean of the Graduate School.

All applications should be filed with the Dean of the Graduate School not later than March 1st.

THE GRASSELLI CHEMICAL COMPANY FELLOWSHIP

Through the generosity of the Grasselli Chemical Company of Cleveland, Ohio, a fellowship in chemistry has been established at the Ohio State University. This fellowship carries with it a stipend of $750. An applicant for the fellowship must have had sufficient training in chemistry to enable him to begin at once active research work. If the applicant has not received the degree of Doctor of Philosophy then the re-

search work accomplished may be presented as a dissertation for this degree.

No limitations are placed upon the fellowship other than that the Grasselli Chemical Company may request that the subject of the investigation be chosen from the field of organic chemistry rather than that of inorganic chemistry or vice versa.

Candidates for this fellowship should file their applications with the Dean of the Graduate School not later than March 1st. Application blanks may be obtained by addressing the Dean of the Graduate School, The Ohio State University.

RESEARCH FELLOWSHIPS IN CERAMICS

Engineering Experiment Station-United States Bureau of Mines

In cooperation with the United States Bureau of Mines, the Ohio State University offers three fellowships in the Engineering Experiment Station. The stipend is $750 for a period of nine months, starting September 1st. These fellowships are open to college graduates who have had sufficient training in Ceramics, Metallurgy, or Chemistry to carry on the particular research assigned. The completed research shall constitute the thesis required for the postgraduate degree. Candidates who have completed the requirements in minor subjects shall be given preference but the holders of these fellowships may be permitted to carry a maximum of fifteen total credit hours in other University courses during the year, provided not more than six hours of these courses carry laboratory.

Applicants should apply to the Dean of the Engineering Experiment Station, or to the Superintendent of the Ceramic Station, U. S. Bureau of Mines, both of the Ohio State University.

OTHER FELLOWSHIPS

A number of other fellowships are also available, but these vary from year to year. The National Limestone Association and the National Lime Association each maintain a research fellowship at the University.

LIVING ARRANGEMENTS

The President has authority to supervise the living arrangements of students not residents of the city of Columbus, and to order the immediate withdrawal of any student from any boarding or lodging house in which he deems the surroundings to be undesirable.

ROOMS AND BOARD FOR MEN

The University does not possess any dormitory facilities for men. Furnished rooms can be obtained at prices varying from $10.00 to $15.00 a month, and the cost of the table board in the clubs and restaurants near the University is from $6.50 to $8.00 a week. Board for men can be secured at the Ohio Union at reasonable prices.

Board with furnished rooms can be obtained in private families within convenient distance from the University at rates varying around $10.00 a week.

WOMEN STUDENTS

The Ohio State University is open to women upon the same conditions and by the same methods of registration offered to men. Within twenty-four hours after formal registration, every young woman must also register with the Dean of Women at her office in Pomerene Hall.

LIVING ARRANGEMENTS FOR WOMEN

It is recommended that women students arrange for a regular boarding place and be dependent neither upon the restaurants in the vicinity nor upon the cooking of their own meals. A list of approved houses for women with some indication of the character and price of rooms may be obtained from the Dean of Women. This list is limited to homes where women only are taken as roomers, and where a parlor is available for callers. Renting a room by mail is not satisfactory, and the University advises either a preliminary visit to Columbus or arrival a day or two before registration. There should always be a definite understanding with the householder as to rates, times of payment, vacation charges, the period for which the room is engaged, and the privileges and rules of the house.

Women students should apply to the Dean of Women in Pomerene Hall for a list of approved lodging houses, and should not select rooms advertised in windows or on the bulletin boards.

The approval of the Dean of Women must be secured for any house not already on the approved list.

The Women's Council has adopted the following rules:

(1) No woman in the University shall occupy a room in a house where men are rooming, except by special permission from the Dean of Women.

(2) All lodging houses shall be considered closed to callers at 10:30 o'clock in the evening.

DORMITORIES FOR WOMEN

Oxley Hall, the hall of residence for women, located at the southwest corner of the Campus on Neil Avenue, accommodates seventy-seven students. The hall contains suites, single and double rooms, with a students' sitting room, dining room, parlor, sun parlor, and laundry. The hall is governed by Student Government with the advice and supervision of the House Superintendent.

Mack Hall, the new dormitory for women, was opened October 1, 1923. It is joined to the south side of Oxley Hall by a cloister. This hall accommodates one hundred girls. It is modern in every respect, with running water in each room. It is under the same management as Oxley Hall.

For particulars, including rates, rules, etc., governing the two halls, address Superintendent, Oxley Hall, Columbus, Ohio.

St. Hilda's Hall has been provided for the women students of the Episcopal Church under the government of the Bishops of Ohio with a local house committee, consisting of church women identified with the University. For information address Superintendent of St. Hilda's Hall, 169 West Eleventh Avenue, Columbus, Ohio.

Presbyterian Hall provides a comfortable home for twenty-four girls. It consists of two houses, Nos. 50 and 54 Fifteenth Avenue, near the main entrance to the University. For information address Superintendent of Presbyterian Hall, 50 Fifteenth Avenue, Columbus, Ohio.

Neil Hall, a residence for women, accommodates three hundred and eighty-four students. For information address Superintendent of Neil Hall, 1634 Neil Avenue, Columbus, Ohio.

THE HEALTH OF WOMEN STUDENTS

It is the purpose of the University to safeguard and promote the health of students in every reasonable way. The Physical Examinations required of all entering women and Sophomore women are used in advising the students as to defects which need treatment or correction, as to the type of Physical Education work adapted to the needs of each student; and, in special cases, as to the academic load and outside work. Students needing special attention are watched through the year by the Medical Adviser. The Medical Adviser to women holds regular daily office hours in Pomerene Hall for consultation and advice.

Lectures on the conservation and promotion of health are given to all Freshmen, and exercises for its maintenance and development are offered in the gymnasium. The Director of Physical Education and members of the staff hold daily office hours for student conferences.

ADMISSION

METHOD OF ADMISSION

The admission of students is in charge of the University Entrance Board, which determines the credits that shall be issued on all entrance examinations and certificates, and furnishes all desired information to applicants. Correspondence relating to admission should be addressed to the University Examiner, The Ohio State University, Columbus, Ohio.

REQUIREMENTS FOR ADMISSION

Admission to the Graduate School is open to all graduates of the Ohio State University as well as to the graduates of all other colleges and universities of approved standing. Before entering upon graduate work in any department, the applicant must present evidence to the effect that he has had the necessary prerequisite training that will enable him to pursue with profit the courses desired. *It must be remembered also that admission to the Graduate School does not imply admission to candidacy for the degree.* No graduate student, not even one who is a graduate of the Ohio State University, is admitted to candidacy for a degree until he has been in residence a sufficient time to enable his instructors to judge of his ability to carry on graduate work.

Information concerning admission to candidacy will be found under the title "Admission to Candidacy for a Degree."

A graduate of a college not on the approved list may be admitted to the Graduate School, provided that his college course, when checked by the University Examiner, entitles him to a credit of not less than one hundred and thirty-five Quarter-credit hours, or ninety semester hours. In all such cases, however, the residence requirement for the graduate degree will be correspondingly increased.

CREDENTIALS FOR ADMISSION

An applicant for admission to the Graduate School must first secure a statement from the registrar or other officer of the university or college of which he is a graduate, which contains the following information: (1) the date of graduation of the applicant; (2) the degree received; (3) the list of courses completed in those subjects which the applicant wishes to pursue in his graduate work. This statement, together with a catalog of the institution of which the applicant is a graduate, should be sent to the University Entrance Board not less than three weeks (an earlier date is preferable) before the opening of the Quarter in which the applicant expects to register. If the credentials are satisfactory, an

admission card to the Graduate School will be mailed promptly to the applicant. If the credentials are not satisfactory or if further information is desired, the applicant will be notified at once by correspondence.

In case the applicant finds it impossible to present in advance the statement referred to in the preceding paragraph, he may present it in person on registration day and receive his admission card. However, the Entrance Board is always crowded with work on the opening days of the Quarters, so that the applicant will find it greatly to his advantage to secure his admission card in advance by correspondence.

REGISTRATION AND ASSIGNMENT OF STUDIES

The candidate should present his card of admission at the office of the Graduate School in Room 106, University Hall, on registration day. He will then receive an election card for presentation to the professor under whom he wishes to take his major work. This professor becomes the adviser of the student and will assist him in mapping out a suitable course of study. His work for the year, or for the degree in question, having been arranged in consultation with his adviser, the courses selected will be entered upon the election card, and this card, bearing the signatures of his professors, thus indicating their approval of the courses selected, will be returned and left on file with the Dean of the Graduate School, who will issue to the student his registration cards.

After a student's election card has been made out for the year, changes in his course of study will be made only upon the written request of the student's adviser, and the statement embodying the reasons for such changes must be left on file with the Dean of the Graduate School. No credit will be given on the University records for courses taken without the proper authorization. Registration should be completed as soon as possible after the opening of the Quarter. *In order to receive credit for work done, the student must have completed his registration within two weeks after the opening of the Quarter.* However, a student desirous of carrying on research work may be admitted at any time upon the recommendation of the professor in charge of the proposed work.

DEGREES CONFERRED

The following higher degrees are conferred by the University: Master of Arts, Master of Science, Master of Arts in Social Administration, Master of Science in Public Health, Doctor of Philosophy.

ADMISSION TO CANDIDACY FOR A DEGREE

Any student wishing to obtain a graduate degree must apply at the appropriate time for admission to candidacy for the degree sought. Application blanks may be obtained at the office of the Graduate School. Admission to candidacy signifies that in the opinion of his professors, the applicant has the necessary training and ability to pursue graduate

study with profit. Further information concerning admission to candidacy will be found under the headings "Requirements for the Degrees of Master of Arts and Master of Science" and "Requirements for the Degree of Doctor of Philosophy."

GRADUATE STUDENTS NOT CANDIDATES FOR A DEGREE

Graduate students who are not candidates for a higher degree are not required to designate major or minor subjects, but may elect their work with a view to the special purpose for which they are in attendance at the University. Any course of study announced for advanced undergraduates and graduates is open for election by such students upon the same conditions that are imposed upon those who are candidates for degrees.

Should a graduate student who has not arranged his work with a view to obtaining a degree, subsequently desire to become a candidate for a degree, the amount of credit he is to receive for work already done will be determined at the time he applies for admission to candidacy for the degree.

STANDARDS OF WORK REQUIRED OF GRADUATE STUDENTS

The work of all graduate students performed in connection with the development of theses and dissertations is reported simply as "Prog" indicating progress. All other work is reported as "A" Excellent, "B" Good, "C" Average, "D" Poor, "E" Failed.

A graduate student doing acceptable work must attain the mark "A" or "B" in not less than two-thirds of the work included in the course of study outlined for his graduate degree, and the mark of "C" or higher in the remaining one-third.

Any candidate for an advanced degree whose record is deficient under this plan is not admitted to the final examination for the degree sought, except by special action of the Graduate Council on request of the Committee in charge of the candidate's work.

All graduate students registered in "600" courses shall be required to complete a certain amount of work in addition to that required of undergraduates. This may consist of reading additional books on the subject, the presentation of reports, or of such other work as the instructor in charge of the course may deem wise.

SENIORS TAKING COURSES FOR GRADUATE CREDIT

A Senior whose full time is not required in order to complete the work for his baccalaureate degree may select certain courses for graduate credit, but in order to do this the permission of the Graduate Council must be obtained before registering for the courses.

REQUIREMENTS FOR THE DEGREES OF MASTER OF ARTS AND MASTER OF SCIENCE

In general, the degree of Master of Arts will be conferred for major work of a non-technical character, while the Master of Science degree will be conferred for major work of a technical character. The degree of Master of Arts will usually be conferred upon candidates whose major work lies in the departments properly included in the College of Arts, Philosophy, and Science, the College of Education, or the College of Commerce and Journalism, while the degree of Master of Science will usually be conferred upon candidates whose major work lies in the College of Agriculture, the College of Engineering, the College of Medicine, or the College of Veterinary Medicine.

Residence Requirement. A residence of three Quarters wholly devoted to graduate work is required; but a graduate of this University may do not to exceed one-half of the required work at another institution having equivalent opportunities for study. The candidate is, however, subject to final examination by the Ohio State University on all work offered for the degree.

A student holding a graduate assistantship must spend at least six weeks in addition to the three Quarters, in order to fulfill the residence requirement. For a part-time assistant, a minimum residence of four Quarters is required.

Students entering from other accepted graduate schools will be credited with work already completed, provided authorized statements are presented to the effect that such students have credit in the graduate school for the work specified. *However, no student will be given a degree by the Ohio State University unless he has been in residence at least three Quarters and has satisfactorily completed forty-five Quarter hours in this University.*

Course of Study. The course of study shall consist of one major and one or two minors, preferably one. The major and minor subjects must be under at least two different professors and in lines of work distinct from each other. It is often possible for both the major and the minor work to be in the same department and yet fulfill the conditions given above. It is expected that the student shall devote about two-thirds of his time to his major subject and the remaining one-third to his minor. However, variations from this regulation may be made for valid reasons.

While qualification for the Master's degree is not contingent upon the completion of a definite number of hours of work, nevertheless, the amount of work required will usually aggregate not less than the equivalent of fifteen hours of classroom work throughout three Quarters, inclusive of the thesis.

Admission to Candidacy. Each candidate for a Master's degree must file his application for admission to candidacy with the Secretary of the Graduate School, at a date not later than two weeks prior to

the opening of the Quarter in which the degree is sought. The applications are made upon special blanks secured from the office of the Graduate School. These applications are passed upon by the Executive Committee of the Graduate Council. Admission to candidacy is based upon undergraduate training and ability to pursue graduate work as revealed by the official reports upon the student's course. No student will be admitted to candidacy until he has completed at least the equivalent of one Quarter's work.

Examination. Each candidate is required to pass the regular final examinations upon all work included in his course with grades in accordance with the regulations of the Graduate School. There is also required an oral examination to test the candidate's knowledge of his major subject. This oral examination is conducted by a committee appointed by the Dean of the Graduate School. This committee is composed of the professor under whom the candidate has prepared his thesis (Chairman), at least one member of the instructional force nominated by him, and a representative of the Graduate Council. The Chairman of this committee is responsible for the arrangement of the oral examination and for the certification of its results to the Dean of the Graduate School. The examination shall not be held until after the submission and approval of the thesis.

A candidate for the Master's degree who fails in his final oral examination must register in the Graduate School and carry on work for an additional Quarter before an opportunity will be given for a second oral examination, unless special permission is granted by the Graduate Council for an earlier examination at the request of the department concerned.

Thesis. A satisfactory thesis is required. The subject of the thesis, together with the written approval of the professor directing the work, must be filed in the office of the Graduate School at a date not later than that on which the candidate applies for admission to candidacy.

A candidate who expects to receive his degree at the end of a given Quarter must submit the completed manuscript of his thesis ready for typewriting to the member of the instructional staff who has directed the work, not later than three weeks prior to Commencement Day. If the manuscript is approved the candidate proceeds at once to prepare two typewritten copies of the same, following specifications which may be obtained at the office of the Graduate School. The thesis so prepared shall be presented for acceptance to the member of the instructional staff who has directed the work, at least one week prior to Commencement Day. If the thesis is then approved the student shall deposit it in duplicate with the University Editor *not later than five days before Commencement Day*, and shall pay to the Editor a fee covering the cost of binding the same.

In case the thesis has already been published, the candidate, instead of following the above procedure, may present two printed copies to the member of the instructional staff who has directed the work, not later than three weeks prior to Commencement Day. The form of printing as

well as the contents must be approved by this instructor. If the thesis is so approved the student shall deposit these copies with the University Editor not later than five days before Commencement, and shall pay to the Editor a fee covering the cost of binding the same.

The thesis requirement may be waived by the Graduate Council upon the recommendation of the professor in charge of the major subject. In all cases where the requirement is waived action must be taken prior to the date for the filing of the thesis subject.

Diploma Fee. A special graduation fee of $10.00 is required of each person receiving a graduate degree from the University. This fee must be paid thirty days *before* the close of the Quarter in which the candidate expects to receive his degree. Failure to comply with this rule involves a penalty of $5.00. (See page 18.)

GRADUATE COURSE IN PUBLIC HEALTH

This course leads to the degree of Master of Science in Public Health. The principal object of the course is to prepare young men and women for public health work; to fit them to occupy administrative and executive positions as health officers, members of boards of health, secretaries, agents, or inspectors of health organizations.

REQUIREMENTS FOR ADMISSION TO THE GRADUATE COURSE IN PUBLIC HEALTH

Graduates of any class "A" medical school will be admitted upon their record to the course in Public Health and registered as candidates for the degree of Master of Science. Any person holding the degree of Bachelor of Arts or an equivalent degree from the Ohio State University or from any other institution of like standing, will be admitted to the course in Public Health provided preliminary training has been taken in his collegiate course in each of the following subjects: chemistry (general and qualitative), 15 hours; physics, 10 hours; zoology (elementary), 10 hours; comparative anatomy (vertebrate), 5 hours; physiology, 10 hours; and bacteriology (general and pathogenic), 11 hours.

In order to meet these requirements graduates of the Ohio State University should have had the following courses (see Bulletin of the College of Arts, Philosophy, and Science), while graduates of other universities and colleges should have had their equivalents:

General Chemistry and Qualitative Analysis 401-402-403 or 411-412-413
General Physics 401-402 or 403-404
Elementary Zoology 401-402
Comparative Anatomy 401-402 or 406 (5 hours)
Physiology 403-404
General and Pathogenic Bacteriology 607, 608, 609

Students who do not expect to complete all the work required for the degree and who desire to fit themselves for some special field may be admitted to certain individual courses. See "Prerequisites for Graduate Work" in Public Health.

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN PUBLIC HEALTH

The statements given above in reference to the residence requirement, admission to candidacy, examination, and thesis of all candidates for the degrees of Master of Arts and Master of Science apply also to candidates for the degree of Master of Science in Public Health. The course of study, however, is a fixed one and is as follows:

CURRICULUM IN PUBLIC HEALTH

Autumn Quarter		Winter Quarter		Spring Quarter	
Public Health	(802) 4	Public Health	(801) 3	*Public Health	(807) 2
Public Health Problems		Personal Hygiene		Demography	
Public Health	(809) 4	Public Health	(803) 3	Public Health	(817) 2
Communicable Diseases		Industrial Hygiene		Medical Aspects of Public Health	
Public Health	(813) 4	Public Health	(808) 2	Engineering	
Public Health: Laboratory		Social Service and Public Health Nursing		Public Health	(815) 4
Civil Engineering	(602) 5	Civil Engineering	(703) 4	Public Health: Laboratory	
Sanitary Engineering		Water Supply Engineering		Public Health	(816) 6
		Public Health	(814) 4	Major Research	
		Public Health: Laboratory			

GRADUATE COURSE IN SOCIAL ADMINISTRATION

The principal object of this course is to prepare men for administrative positions in social work such as the administration of Financial Federations and Community Councils of Cities, and the executive positions of the Red Cross, State Boards of Administration, Charity Organization Societies, Community Welfare Organizations, Playground Associations, etc.

REQUIREMENTS FOR ADMISSION TO THE GRADUATE COURSE IN SOCIAL ADMINISTRATION

In order to be admitted to this course students must have completed the undergraduate course leading to the degree of Bachelor of Science in Social Administration at the Ohio State University or a similar course offered at another approved institution. It is possible for such students to complete the course in one year.

* Not given in 1926-1927.

Graduates of approved institutions who have not completed an undergraduate course in Social Administration, but who have had considerable training in Sociology, may also be admitted to the graduate course in Social Administration. Such students, however, will have to take a certain amount of additional work, the character and amount of which will depend upon their previous training, so that it will not be possible for them to obtain the degree of Master of Arts in Social Administration in one year.

Students whose general education, maturity, and experience justify it, may be admitted to the course without becoming candidates for the degree and pursue subjects for which they are qualified.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN SOCIAL ADMINISTRATION

This course for properly qualified students leads to the degree of Master of Arts in Social Administration. To receive this degree students must be in residence at the Ohio State University at least one year. Upon the passing of an examination upon the subjects required and upon the completion of a satisfactory thesis, which is required of all candidates for the Master's degree, the degree of Master of Arts in Social Administration will be conferred.

CURRICULUM IN SOCIAL ADMINISTRATION

Autumn Quarter		Winter Quarter		Spring Quarter	
Sociology (845) Methods of Sociological Investigation	3	Sociology (846) Methods of Sociological Investigation	3	Sociology (815) The Community	4
Sociology (811) Modern Social Welfare Movements	4	Sociology (812) Modern Social Welfare Movements	4	Sociology (816) Community Surveys	4
Sociology (821) Graduate Seminary	2	Sociology (822) Graduate Seminary	2	Sociology (696) Social Case Work	3
Electives	7	Sociology (695) Social Case Work	3	Electives	5
		Electives	4		

For those who for any reason do not follow the regular curriculum there are available the following courses for election: Public Health; Leisure and Recreation; Organization and Administration of Recreation Agencies; Criminology; Penology; the Handicapped, Defectives, and Dependents; Needy Families and Children; the Race Problem; Municipal Sociology; Rural Social Institutions; Social Statistics.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Residence Requirement. It is intended that this degree shall be given not as a certificate of faithful and industrious work for a specified length of time, but rather as an evidence of high attainments in scholarship and especially of an ability to carry on independent research in a chosen field. These qualities cannot be secured by less than three years of work devoted wholly to graduate study with suitable facilities and under proper supervision. Of these years at least one and that, except by permission of the Graduate Council, the last, must be spent in residence at this University. In case any part of the work is done elsewhere than in this University, such work shall be subject to the approval of the Graduate Council.

Course of Study. The course of study consists of one major and either one or two minor subjects, and must be approved as a whole by the Graduate Council upon the recommendation of a Committee designated by the Council from the professors in charge of the subjects proposed. Ordinarily, the major subject and at least one of the minors are in different departments. In special cases where the major work lies in a department which covers a broad field of study, such as the Department of Chemistry or that of Zoology and Entomology, the entire work for the Doctor's degree, by special vote of the Graduate Council, may be taken in one department.

In his major study the student is expected to become thoroughly familiar with the general results that have been obtained in the past and by leading contemporary investigators, as well as the methods of research by which these results have been obtained. The minor subjects are prescribed in order to guard the student against the dangers of overspecialization, and to secure for him the benefits to be derived from contact with other subjects and the personalities of other teachers. No choice of minors that disregards these ends will be approved by the Council, nor will one that goes to the other extreme in the selection of subjects which are not obviously related to the student's major work.

A student who for any reason desires to carry on off-campus research work in connection with his thesis or dissertation must have his program approved in advance by the appropriate department and by the Graduate Council and must maintain his registration in the Graduate School during this entire period unless excused by the Council. This does not apply to regular *ad interim* work.

Language Requirement. A reading knowledge of French and German, sufficient to enable the student to use these languages for the purpose of research in his major work, is required. The professor in charge of the major subject may also, in case he judges it necessary, require a reading knowledge of one or more additional languages. The language requirement is a part of the preliminary examination and must be satisfied before the student is admitted to candidacy.

Admission to Candidacy. Not later than the end of the second week after the opening of the third Quarter previous to the date at which the candidate hopes to obtain his degree, he must file with the Dean of the Graduate School, on a blank provided for the purpose, a formal application for admission to candidacy. This application must indicate the candidate's choice of major and minor subjects, and the title of the proposed dissertation, and must bear the endorsement of the professor whom he desires to have placed in charge of his major subject.

Preliminary Examination. Upon receipt of the application for admission to candidacy, the Dean of the Graduate School shall arrange for the preliminary examination for the purpose of determining the student's acceptability as a candidate for the degree. This examination shall be conducted not later than the middle of the Quarter in which the application is presented and shall include the following:

First: The modern language requirement in case this requirement has not already been met. This examination shall be conducted by the head of the department concerned. The candidate must give at least two weeks notice to the language department concerned that he intends to come up for his examination. This notification shall consist of a statement of the candidate's major subject, together with at least a partial list of the technical books and articles which he has read in that language. Blanks for this purpose may be obtained at the office of the Graduate School. The examiner will choose for the examination a text in line with the student's technical interest, and preferably a text not familiar to the candidate. The examination will be given under the normal conditions of reading in a foreign language, such as access to a dictionary or technical glossary.

Second: A test of the student's fitness to pursue his studies for the degree in the fields of study selected. This examination shall be conducted by a committee consisting of the professor in charge of the candidate's dissertation (who shall serve as Chairman), one or more representatives from each of the departments of the student's major and minor subjects, and one representative of the Graduate Council, who is not a member of the department in which the candidate's major lies. The members of the committee shall be designated by the Dean of the Graduate School, after consultation with the Chairman of the committee. The examination may be partly or wholly oral. It shall not be regarded as final on any part of the work included in the candidate's course of study; it is conducted solely with the view of determining whether or not the student should be admitted to candidacy for the degree.

Final Examination. The final examination is divided into two parts, as follows:

(a) Departmental Examination. This examination is conducted by a committee, consisting of the professor in charge of the candidate's dissertation (Chairman), and one representative for each of the minor subjects. In large departments, one or more additional representatives of the major subject may be added. The personnel of this committee is

fixed by the Dean of the Graduate School after consultation with the Chairman. It is the duty of the Chairman of the committee to call the committee together and arrange for the examination. The examination shall not be held until after the submission and approval of the dissertation. It is expected that this examination shall be chiefly, if not wholly, written, and shall cover both the major and minor fields of study. The Chairman shall make a written report to the Graduate Council upon the method and results of the examination.

(b) Oral Examination in Presence of Representatives of the Graduate Council. Upon presentation of evidence that the departmental examination has been passed satisfactorily, the candidate is then admitted to an oral examination in the general fields of study included in his major and minor. This examination is conducted by the committee in charge of the departmental examination together with three (or more) representatives of the Graduate Council. The time and place of this examination shall be fixed by the Dean of the Graduate School.

Dissertation. A dissertation which shall make a definite contribution to knowledge of importance sufficient to warrant its publication shall be offered by the candidate. *A copy of the dissertation bearing the written approval of the professor under whose direction the work was done must be presented to the Dean not less than four weeks previous to the end of the Quarter in which the degree is sought.*

The Dean, after consultation with the professor in charge of the major subject, shall then appoint a Committee to consider the merit of the dissertation. The dissertation, together with the report of this Committee, shall be laid before the Council, who will then vote upon the question of its acceptance.

Publication of the Dissertation. The regulations require that the candidate for the degree of Doctor of Philosophy must deposit in the University Library one hundred copies of his dissertation, printed, mimeographed or multigraphed in acceptable form and complying with the specifications obtainable in the office of the Graduate School. If possible, these copies must be deposited not later than five days prior to Commencement.

If, for any reason, the candidate finds it impossible to print and deposit the one hundred copies of his dissertation before the Commencement Day on which he expects to obtain his degree, he may deposit in the office of the Graduate School duplicate copies of his dissertation, typewritten and complying in form with specifications obtainable in the Graduate School office, together with an abstract of the dissertation not exceeding three thousand words in length. At the same time, as an evidence of good faith that the candidate will proceed with the publication of the dissertation at an early date, he must deposit with the Bursar of the University $100.00 in cash. This sum will be returned as soon as the dissertation is printed and the one hundred copies of the same deposited in the University Library. If, for any reason, the dissertation

is not printed within a period of two years, then the University will proceed to print the dissertation in whole or in part, using the deposit to pay the cost of publication.

Diploma Fee. A special graduation fee of $10.00 is required of each person receiving a graduate degree from the University. This fee must be paid thirty days *before* the close of the Quarter in which the candidate expects to receive his degree. Failure to comply with this rule involves a penalty of $5.00. (See page 18.)

COMMENCEMENT—CONVOCATION

A special Convocation or Commencement is held at the close of each Quarter for the conferring of degrees upon candidates who have fulfilled all the requirements of their respective courses.

ATTENDANCE AT CONVOCATION EXERCISES

All candidates for degrees are required to be present at their graduation convocation unless excused by the President. Only those students who are to receive their degrees at a given convocation may appear in the class procession on that occasion or be seated with the graduating class.

GRADUATE WORK IN THE SUMMER QUARTER

Candidates for the Master's degree may complete the residence requirement for such a degree by pursuing graduate work at the University for three full Quarters. For the benefit of those who cannot stay during the entire Summer Quarter, this Quarter is divided into two equal terms; and candidates for the Master's degree may complete their residence requirement by pursuing graduate work for *four* summer terms, provided that in the *ad interim* periods between the Summer Quarters a satisfactory amount of work is completed. This work, however, cannot be extended over a period longer than five years.

AD INTERIM WORK

No students are allowed to pursue *ad interim* work unless they have been in residence at least one term. Moreover, it is optional with any member of the instructional force as to whether or not he will conduct such work. The amount of such work that will be credited towards an advanced degree is limited to 15 Quarter hours, and the amount during any one *ad interim* period to 8 Quarter hours.

A student who wishes to pursue *ad interim* work will proceed as follows: At the close of the Summer term in which he is in residence he will obtain from the office of the Graduate School an appropriate card and, after consultation with the professor in charge of the proposed *ad interim* work, will enter upon this card a brief outline of the work to be pursued in the *ad interim* period. After securing the signature of

the professor, thus signifying his approval to conduct the proposed *ad interim* work, the student will deposit this card in the office of the Graduate School. As an evidence of earnest intentions, he must also register in the University (this does not imply attendance) for at least one Quarter of each period during which the *ad interim* work is being pursued. He is also required to report to the professor conducting his work at least once a month and to pass such examinations as may be prescribed. He may secure from the University Library such books as may be necessary for the successful conduct of the work, but will be required to pay for the cost of shipment. Requests for such books should be sent to the Dean of the Graduate School.

THE FRANZ THEODORE STONE LABORATORY

(Formerly The Lake Laboratory)

The Franz Theodore Stone Laboratory on Gibraltar Island, Put-in-Bay, Ohio, affords exceptional opportunities for graduate students in botany, entomology, and zoology during the summer. The general rules that apply to graduate work carried on at the University during the Summer Quarter apply equally to the graduate work taken at the Laboratory. The work of instruction is carried on by members of the University Faculty and by members of the faculties of other colleges and universities. Students interested in this work should send to the University Examiner for the Franz Theodore Stone Laboratory Bulletin.

THE PLANT INSTITUTE

The Plant Institute of the Ohio State University is an organization within the College of Agriculture for furthering research with plants. It affords graduate students the combined facilities of the departments of Botany, Horticulture, Farm Crops, Agricultural Chemistry, and Soils.

The instructional force and graduate students of these departments meet in a seminary for the discussion of problems connected with plant life.

The Institute, through its executive committee consisting of representatives from the several departments, reviews all thesis projects of candidates for higher degrees majoring in plant subjects in the departments of the College.

UNIVERSITY ORGANIZATIONS

There are a number of organizations in the University of especial interest to the graduate students. The Gamma Alpha Fraternity, the graduate scientific society, has its own house at which a number of the members of the society live and a still larger number board. There is also a Junior Open Court composed of not more than two representative

members of the various departments; likewise the Graduate Club in social educational sciences, and the Women's Graduate Club.

The main object of all of these clubs is to bring members together for social purposes and for the discussion of the various problems in which the individual members are interested.

There are also chapters of the national honorary societies, Phi Beta Kappa and Sigma Xi, as well as a number of honorary fraternities. In addition to these, there are several departmental societies, such as the Biological Club, the Political Science Club, the Chemical Society, the History Club, and the English Club.

UNIVERSITY LECTURERS

Each year a number of lectures of special interest to graduate students are given by distinguished scholars from various educational institutions. Some of these lectures are of interest primarily to those in certain fields of work while others are of a general character and of interest to graduate students in general, no matter what their fields of activity may be.

DEPARTMENTS OF INSTRUCTION

ACCOUNTING

Office, 309 Commerce Building

PROFESSORS G. W. ECKELBERRY AND GREER, MR. WALL, MR. BOLON, MR. WILLCOX, MR. SHONTING

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: An acceptable course in the elements of accounting in addition to any prerequisites stated in the description of the courses. Course 606 requires as a prerequisite an acceptable course in economics.

601. Advanced Principles of Accounting. Five credit hours. One Quarter. Autumn, Winter, Spring. Five lectures and recitations each week. Mr. Bolon, Mr. Shonting.

The principles of modern accounting, especially those connected with the corporate balance sheet and income statement. Accounting problems arising in the organization of a corporation. Treatment of capital stock and bond issues, depreciation. Various forms of income statements in typical manufacturing enterprises. Principles of valuation of assets.

602. Advanced Principles of Accounting. Five credit hours. One Quarter. Autumn, Winter, Spring. Five lectures and recitations each week. Prerequisite, Accounting 601. Mr. Eckelberry.

The accounting procedure in connection with corporate reorganization and dissolution. Consolidated balance sheets and income statements, branch house accounting, foreign exchange accounting. Problems in the preparation of statements of brokers, building and loan associations, insurance companies and public utilities.

603-604. Cost Accounting. Four credit hours. Two Quarters. 603, Autumn and Winter; 604, Winter and Spring. Three lectures and recitations and one two-hour laboratory period each week. Prerequisite or concurrent, Accounting 601. Not open to students who are taking Accounting 624. Mr. Willcox.

Accounting 603: General methods of collecting costs of material, labor, and burden and incorporating them in the books of account. Cost control including the use of the perpetual inventory and various subsidiary ledgers.

Accounting 604: Various methods of distributing burden costs. Presentation of cost data. Problems of cost accounting in multiple process industries.

605. Problems in Cost Accounting. Three credit hours. Autumn Quarter. Prerequisite, Accounting 604 or 624. Mr. Greer.

A study of special problems in cost accounting supplementary to the general introductory material given in prerequisite courses. Special attention is given to the treatment of process, by-product, and joint-product costs, methods of estimating and predetermining costs, and adjustments in cost finding procedure required by abnormal production conditions.

606. Institutional Accounting. Five credit hours. Winter Quarter. Three recitations and two two-hour laboratory periods each week. Open to students who are registered in Home Economics 631. Mr. Eckelberry.

This course is designed primarily for students expecting to enter the field of institutional management. The elementary principles of account construction are developed with special emphasis upon the interpretation and use of accounting reports and records for managerial control.

607-608. Auditing. Two credit hours. Two Quarters. 607, Autumn and Winter; 608, Winter and Spring. Prerequisites, Accounting 602 and 604. Mr. Eckelberry, Mr. Wall.

The various kinds of audits and their respective uses. Methods followed in verifying balance sheets and profit and loss accounts. Audit reports and certificates. Duties and responsibilities of an auditor.

***609. Industrial Auditing.** Three credit hours. Winter Quarter. Prerequisite, Accounting 604 or 624. Permission of instructor necessary. Mr. Greer.

The principles of auditing with particular reference to the accounts of manufacturing enterprises. Problems in connection with the verification of work in process and other inventories, proper valuation of plant and equipment, wasting assets, etc. Internal audits and methods of internal check are given special attention.

610. Cost Accounting System. Three credit hours. Winter Quarter. Prerequisite, Accounting 604 or 624. Mr. Greer.

A study of cost accounting systems of various types, including practice in designing forms and procedure for representative industries. Attention is given to uniform cost systems adopted by various trades.

611. Income Tax Accounting. Two credit hours. One Quarter. Autumn and Spring. Two hours of lectures, problems, and recitations each week. Prerequisite, Accounting 601. Mr. Wall, Mr. Bolon.

The accounting principles and procedure involved in the Federal taxes on income and profits. Practice in preparing income tax returns from the accounts of individuals, partnerships, and corporations.

612. Constructive Accounting. Four credit hours. One Quarter. Autumn and Spring. Four hours of lectures, problems, and recitations each week. Prerequisite, Accounting 603-604. Mr. Greer.

Practice in designing accounting systems for typical business enterprises.

613-614. Accounting Practice. Four credit hours. Two Quarters. 613, Autumn and Winter; 614, Winter and Spring. Four hours of lectures, problems, and recitations each week. Prerequisite, Accounting 602 and 604. Mr. Eckelberry, Mr. Greer.

Practice in the solution of typical accounting problems. The class material is taken largely from the Certified Public Accountants' examinations of the various states.

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* Not given in 1926-1927.

616. Business Statements. Three credit hours. One Quarter. Autumn and Spring. Three hours of lectures and problems each week. Prerequisite, Accounting 601. Mr. Eckelberry, Mr. Bolon.

A study of the different kinds of statements prepared by corporations for the guidance of executives, directors, stockholders, and creditors. The methods used in preparing the necessary statements together with the principles of statement interpretation. Use is made of current statements of well-known corporations. Lectures and problems.

617. Managerial Accounting. Three credit hours. Spring Quarter. Three hours of lectures, problems, and recitations each week. Prerequisites, Accounting 604 or 624 and Economics 622. Mr. Greer.

The preparation and presentation of accounting reports to manufacturing executives. The interpretation of comparative statements. Sources of budgetary information and methods of budget control. The relation of the budget to the manufacturing and profit and loss statements, and balance sheet. Estimated balance sheets, and profit and loss statements.

621. Fiduciary Accounting. Two credit hours. Winter Quarter. Prerequisites, Accounting 601 and Economics 631-632. It is strongly urged that Economics 633 be taken previously or concurrently. Mr. Eckelberry.

The principles underlying the accounting problems encountered in the administration of trust estates. Records and statements of receivers, trustees, executors and administrators. Special attention is devoted to the accounting aspects of the Federal Income Tax Law, the Federal Estate Tax, and the Ohio Inheritance Tax. Lectures and problems.

622. Advanced Accounting Theory. Three credit hours. Spring Quarter. Prerequisites, Accounting 601 and 602. Mr. Eckelberry.

An examination of some of the prevailing theories of accounting. Recent theories in connection with the valuation of assets; the determination of income and surplus. Each student is required to make a report covering the investigation of some particular subject. Lectures, recitations, and readings.

623. Retail Accounting. Three credit hours. Autumn Quarter. Three lectures and recitations each week. Not open to students who are taking Accounting 612 or doing major work in the Accounting group. Mr. Greer.

The principles of accounting as applied to the operations of retail merchandising enterprises. A study of the forms and procedure used in retail stores, with particular reference to the systems of the department stores, chain stores, and other establishments prominent in the field. The course is intended primarily for students whose major interest is in fields other than accounting.

624. Factory Costs. Five credit hours. One Quarter. Autumn and Spring. Five hours of lectures and recitations each week. Not open to students taking Accounting 603-604. Mr. Willcox.

A study of factory accounting methods, with particular reference to the handling of material, labor and finished goods records, expense distribution, and cost finding procedure in general. The course is intended primarily for students whose major interest is in fields other than accounting. Emphasis is placed on the relationship of the cost accounting work to that of other factory departments, such as supervision, production, and engineering.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Research in Accounting. Permission of the instructor necessary.

AGRICULTURAL CHEMISTRY

Office, 211 Townshend Hall

PROFESSOR LYMAN, ASSISTANT PROFESSORS ALMY AND BURRELL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Acceptable courses in the elements of chemistry in addition to any prerequisites stated in the description of the courses. Course 602 requires also an acceptable course in organic chemistry and quantitative analysis, or a course in agricultural analysis; 607 an acceptable course in physiology; and 608 an acceptable course in animal husbandry.

601. General Biological Chemistry. Five credit hours. Autumn Quarter. Three lectures and two three-hour laboratory periods each week. Mr. Burrell.

A study of the chemistry of the fats, carbohydrates, proteins, and other compounds of biological importance, and the general chemistry of the metabolism of plants and animals. This course is intended for students majoring in biological subjects, and as a prerequisite to certain advanced courses in this department.

602. Food Inspection and Analysis. Five credit hours. Autumn Quarter. One lecture and four three-hour laboratory periods each week. Mr. Lyman, Mr. Almy.

Lectures on the composition of foods, methods of analysis, and the detection of adulteration in foods. Laboratory work includes the analysis of cereal foods, the use of the microscope in the detection of adulterants in spices, the identification of added colors, the detection and determination of chemical food preservatives, and the analysis of milk. This course is designed to give preparation for the analytical work connected with the state control of the sale of foods.

603. Food Inspection and Analysis. Five credit hours. Winter Quarter. One lecture and four three-hour laboratory periods each week. Prerequisite, Agricultural Chemistry 602. Mr. Lyman, Mr. Almy.

This course is a continuation of Agricultural Chemistry 602. Laboratory work includes the analysis of edible fats and oils, sugars and syrups, vinegars, flavoring extracts, and beverages.

604. Dairy Chemistry. Five credit hours. Autumn Quarter. One lecture and four three-hour laboratory periods each week. Mr. Almy.

The constituents of milk are studied, using lectures, textbooks, and assigned readings. Laboratory work includes the separation and study of the constituents of milk.

605. Dairy Chemistry. Five credit hours. Winter Quarter. One lecture and four three-hour laboratory periods each week. Prerequisite, Agricultural Chemistry 604. Mr. Almy.

Laboratory and lectures on the analysis of dairy products, milk, condensed milk, dried milk, and butter. This course is designed to teach the methods of analysis used in the chemical control of manufacturing plants and the legal control of dairy products.

606. Advanced Dairy Chemistry. Five credit hours. Spring Quarter. One lecture and four three-hour laboratory periods each week. Prerequisite, Agricultural Chemistry 605. Mr. Almy.

This course is a continuation of Agricultural Chemistry 605. The analysis of ice cream and cheese is made and chemical problems involved in their manufacture considered. Food colors used in butter, cheese, and ice cream are studied. Flavoring extracts and ice cream improvers are analyzed.

607. Chemistry of Nutrition. Five credit hours. Winter Quarter. Two lectures and three three-hour laboratory periods each week. Mr. Lyman.

Lectures on the chemistry of nutrition. Laboratory work includes experiments on digestion and utilization of food, determination of fuel value of food and the heat production of man under various conditions, the analysis of blood for waste products of metabolism, the effects on small animals of diets consisting of purified food constituents, and the effects of selected diets on the formation of waste products in the body.

608. Animal Nutrition. Five credit hours. Winter Quarter. Two lectures and three three-hour laboratory periods each week. Prerequisite, Agricultural Chemistry 601. Mr. Lyman.

Lectures on the chemical problems involved in growth, maintenance and fattening of animals, and in the production of milk and work. The composition of feeds and farm rations is discussed from the standpoint of the more recent conception of animal nutrition. Laboratory work includes the determination of coefficients of digestibility, the determination of protein and mineral storage during growth, a study of the energy requirement, and the effect of selected rations on animals.

701. Special Problems. Three to fifteen credit hours, taken in units of three or five hours each Quarter for one or more Quarters. Autumn, Winter, Spring Quarters. All instructors.

Students electing this course must have had at least two five-hour courses in the department. Consent of the department must be secured.

FOR GRADUATES

Prerequisite for Graduate Work: For a student majoring in agricultural chemistry at least six Quarters of work in chemistry is required as a prerequisite. This work must include acceptable courses in general and organic chemistry and quantitative analysis.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Plant Chemistry. Five credit hours. One Quarter. Winter and Spring. Lectures and laboratory to be arranged. Prerequisite, Agricultural Chemistry 601 or its equivalent and the consent of the instructor. Mr. Burrell.

Lectures, laboratory, and collateral reading on special phases of the chemistry of plant metabolism.

802. Special Problems. Five to fifteen credit hours. Autumn, Winter, Spring Quarters. A total of fifteen credit hours may be obtained in this course by continuing the course for three Quarters. Laboratory, library, and conference work amounting to fifteen hours each week. Prerequisite, Agricultural Chemistry 601 and the consent of the instructor. Mr. Lyman.

This course consists of studies of special methods, such as the separation of the fatty acids from a selected fat, the preparation of certain carbohydrates, or animal acids, the determination of the distribution of nitrogen in a protein by the Van Slyke method, or minor problems in animal or plant nutrition. The student will choose, with the advice of the instructor, the particular problem to be studied. This course is recommended as part of a minor toward an advanced degree.

803. Research. Five, ten, or fifteen credit hours. Any Quarter. Laboratory, library, and conference work. Prerequisite, consent of the instructor. Mr. Lyman.

Research may be done in nutrition, plant chemistry, food analysis, or dairy chemistry.

804. Seminary. One credit hour. Autumn, Winter, Spring Quarters. Required of all graduate students majoring in agricultural chemistry. Mr. Lyman.

AGRICULTURAL EDUCATION

Office, 209 Horticulture Building

PROFESSOR STEWART, ASSISTANT PROFESSOR NISONGER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Acceptable courses in vocational agriculture.

601. Special Methods of Teaching Vocational Agriculture in Secondary Schools. Five credit hours. One Quarter. Winter and Spring. Five recitations each week. Mr. Nisonger.

An intensive application of the information and practices given in the preceding departmental courses to the preparation of material for specific agricultural courses. The organization of subject matter for effective presentation in the classroom, the planning of lessons, laboratory work, and field trips, the methods of teaching through project supervision, and the organization of part-time courses.

†**602. History of Agricultural Education.** Five credit hours. Five recitations each week. Mr. Stewart.

A study of the development of agricultural education, including not only institutional development but also attending agencies, such as fairs, extension teaching, part-time instruction, etc.

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† Not given during the academic year, 1926-1927.

*603. Agricultural Education and the Vocational Education Movement. Five credit hours. Winter Quarter. Five lectures each week. Mr. Stewart.

A study of the development of agricultural education in its relation to the vocational education movement.

FOR GRADUATES

Special problems are designed particularly for the training of supervisors of agricultural education and trainers of teachers of vocational agriculture. In the study of special problems in the methods of observation of teaching vocational agriculture and in the methods of supervised teaching of vocational agriculture, opportunity will be provided for actual practice in conducting courses in observation teaching and supervised teaching in the department's training schools in out-lying villages. Opportunity for the study of special problems will be offered quarterly as enrollment for them demands.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Special Problems. Three to twelve hours as arranged. Autumn, Winter, Spring Quarters. Mr. Nisonger.

Methods of observation teaching in agricultural education.
Methods of supervised teaching in agricultural education.
Special methods of teaching vocational agriculture.
Supervisors and the supervision of agricultural education.
Project organization and supervision in teaching vocational agriculture.
Visual education in teaching vocational agriculture.
Organization and methods of instruction in farm shop courses.
Organization and methods of instruction in part-time courses.

AGRICULTURAL ENGINEERING

Office, Ives Hall

PROFESSORS McCUEN AND REED, ASSISTANT PROFESSOR POTTER, MR. STAHL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in agricultural engineering, mathematics, and physics. Course 604 requires also a course in soils.

602. Farm Structures. Five credit hours. One Quarter. Autumn and Winter. Two lectures, one recitation, and two three-hour laboratory periods each week. Mr. Stahl.

A detailed study of farm buildings from the standpoint of economy, convenience, sanitary requirements, and appearance.

603. Advanced Farm Power and Power Machinery. Five credit hours. Autumn Quarter. Two recitations and three three-hour laboratory periods each week. Mr. McCuen.

A study of economy, use and maintenance of the farm tractor; its operation in the field. Includes also a study of the care and operation of ensilage cutters, feed grinders, threshing machines, corn huskers, and other heavy-belt machinery.

* Not given in 1926-1927.

604. Farm Drainage. Five credit hours. Spring Quarter. Two lectures, one quiz, and two three-hour laboratory periods each week. Mr. Potter.

This course will include the systematic drainage of farm lands, grading, layout, ditching, inlets, outlets, culverts, etc.

Sufficient practice with surveying instruments will be given to enable the student to solve all ordinary drainage problems.

***605. Advanced Field Machinery.** Five credit hours. Spring Quarter. Two lectures and three three-hour laboratory periods each week. Mr. Reed.

A more detailed and complete study of field machinery than is possible in Agricultural Engineering 401. Designed for farm machinery users who want advanced work, for teachers, for those contemplating commercial work, and for those preparing for advanced special problems. Lectures, laboratories, quizzes, and field work.

701. Special Problems. Three to fifteen credit hours, taken in units of three or five hours each Quarter for one or more Quarters. Autumn, Winter, Spring Quarters. All instructors.

Students selecting this course must have had at least two five-hour courses in the department, one of which must have been in line with the problem chosen. Consent of the department must be secured.

FOR GRADUATES

Prerequisite for Graduate Work: Admission to graduate work in agricultural engineering will be granted only to those students having preparation in mathematics through calculus; ten hours of mechanics and strength of materials; and a baccalaureate degree in Agriculture, that shall include not less than thirty hours in agricultural engineering subjects.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Three to ten credit hours each Quarter. Autumn, Winter, Spring Quarters. Library, conference and laboratory work. Time to be arranged. Permission of the department required. Mr. McCuen, Mr. Reed, Mr. Potter.

AMERICAN HISTORY

(See History)

* Not given in 1926-1927.

ANATOMY

Office, Hamilton Hall

PROFESSOR LANDACRE, ASSISTANT PROFESSORS BUCK, KNOUFF, AND BAKER, MR. BRITT, MRS. SEARLES

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in biological science and anatomy in addition to any prerequisites stated in the description of the courses.

601-602-603. Seminary. One credit hour. Autumn, Winter, Spring Quarters. One conference each week. Required of all graduate students taking a major in anatomy. Mr. Landacre, Mr. Knouff, Mr. Baker, Mrs. Searles.

Lectures by members of the staff, conferences on investigations being carried on in the department, and reports on recent investigations in anatomy. Subjects for extended study will be changed from Quarter to Quarter.

604-605-606. Advanced Comparative Anatomy. Three or five credit hours. Autumn, Winter, Spring Quarters. One conference and four or eight laboratory hours each week. Mrs. Searles.

Students will be assigned topics covering individual types, a system of organs in a series of types, or a problem on a single organ for extended study.

607. Comparative Neurology. Five credit hours. Autumn Quarter. One lecture or conference and eight laboratory hours each week. Mr. Landacre.

The origin of the ganglia, central nervous system, and sense organs of the lower vertebrates.

608. Comparative Neurology. Five credit hours. Winter Quarter. One lecture and eight laboratory hours each week. Mr. Landacre.

The reaction systems of the lower vertebrates with special reference to the interpretation of these systems in mammals.

609. Comparative Neurology. Five credit hours. Spring Quarter. One lecture and eight laboratory hours each week. Mr. Landacre.

A study of the reaction systems in mammals with special emphasis on their phylogenetic origin.

610. Cytology. Five credit hours. Autumn Quarter. One lecture and eight laboratory hours each week. Mr. Knouff.

The history of the development of cytological methods of investigation. Structural indications of the chemistry and physics of the cell. Microchemical technique.

611. Cytology. Five credit hours. Winter Quarter. One lecture and eight laboratory hours each week. Mr. Knouff.

Early developmental phenomena including maturation, fertilization, and segmentation with special reference to the significance of nuclear phenomena in relation to genetics.

612. Cytology. Five credit hours. Spring Quarter. One lecture and eight laboratory hours each week. Mr. Knouff.

Cytoplasmic relations and differentiations. The origin, significance, and staining reactions of mitochondria, secretion granules, fibrillae, and the differentiation of cytoplasmic structures in general as distinct from the nucleus.

621. Human Anatomy. Five credit hours. Autumn Quarter. One recitation and four three-hour laboratory periods each week. Mr. Buck, Mr. Britt.

The gross anatomy of the abdomen and leg with the osteology of these parts.

622. Human Anatomy. Five credit hours. Winter Quarter. One recitation and four three-hour laboratory periods each week. Mr. Buck, Mr. Britt.

The gross anatomy of the thorax and arm with the osteology of these parts.

623. Human Anatomy. Five credit hours. Spring Quarter. One recitation and four three-hour laboratory periods each week. Mr. Buck, Mr. Britt.

The gross anatomy of the head and neck including the osteology and the gross anatomy of the central nervous system and sense organs.

624. Histology. Five credit hours. Autumn Quarter. Two recitations, one lecture, and three three-hour laboratory periods each week. The lecture hour may be used as a seminary hour. Mr. Landacre, Mr. Knouff.

The general histology of the tissues and the special histology of the circulatory, skeletal, muscular, respiratory, digestive, and urinary systems.

625. Embryology. Five credit hours. Winter Quarter. Two recitations, one lecture, and three three-hour laboratory periods each week. The lecture hour may be replaced by a seminary hour. Prerequisite, Anatomy 624. Mr. Landacre, Mr. Baker.

The histology of the reproductive organs and the general embryology of the mammal, with special reference to man.

626. Neurology. Five credit hours. Spring Quarter. Two recitations, one lecture, and three three-hour laboratory periods each week. The lecture hour may be replaced by a seminary hour. Prerequisite or concurrent, Anatomy 623. Mr. Landacre, Mr. Baker.

The histology of the central nervous system and sense organs, and the study of the human brain and spinal cord, with special reference to the reaction systems.

627. Topographical Anatomy. Five credit hours. Autumn Quarter. Two lectures or recitations and nine laboratory hours each week. Prerequisites, Anatomy 621, 622, 623. Mr. Buck. Mr. Britt.

The topographical relations of gross anatomy with special reference to surgery, obstetrics, and the general surgical specialties.

628. Special Advanced Anatomy. Three credit hours. Spring Quarter. One conference or lecture and six laboratory hours each week. Prerequisite, Anatomy 627 or its equivalent. Mr. Buck.

Students will select or have assigned to them special regions for dissection and study.

FOR GRADUATES

Candidates for graduate degrees desiring to major in anatomy should present not less than four Quarters' work in biological science of which one or two Quarters must be in subjects listed in the Department of Anatomy.

Students majoring in anatomy as candidates for either the Master's or Doctor's degree must complete for the Master's degree one-half and for the Doctor's degree approximately one-third of their work in courses listed among those for advanced undergraduates and graduates, exclusive of those required in the College of Medicine.

For the present the Department of Anatomy is prepared to offer advanced students a choice of 607, 608, 609, or 610, 611, 612, or 801, 802, 803, or 804, 805, 806. All these courses cannot be offered simultaneously. The instructor in charge must be consulted but an effort will be made to group students with a view to meeting their needs.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Advanced Embryology. Five credit hours. Autumn Quarter. One conference and eight laboratory hours each week. Prerequisite, two years of biological science, of which one must be in anatomy or its equivalent. Mr. Landacre.

A student will be assigned a problem in some phase of vertebrate embryology. The Autumn Quarter will be devoted in part to the mastery of the literature on the subject assigned.

802. Advanced Embryology. Five credit hours. Winter Quarter. One conference and eight laboratory hours each week. Prerequisite, Anatomy 801. Mr. Landacre.

The continuance of the problem assigned in Anatomy 801. The student should familiarize himself with the material of his problem.

803. Advanced Embryology. Five credit hours. Spring Quarter. One conference and eight laboratory hours each week. Prerequisites, Anatomy 801 and 802. Mr. Landacre.

The completion of the problem assigned in Anatomy 801 with the presentation of results.

804. Anatomical Problems. Five credit hours. Autumn Quarter. One lecture and eight laboratory hours each week. Prerequisite, two years of biological science, of which one must be in subjects listed in the Department of Anatomy. Mr. Landacre, Mr. Knouff, Mr. Baker.

The student will be assigned a problem in some subject in anatomy other than embryology. The Autumn Quarter will be devoted in part to a survey of the literature on the subject assigned.

805. Anatomical Problems. Five credit hours. Winter Quarter. One lecture and eight laboratory hours each week. Prerequisite, two

years of biological science, of which one must be in subjects listed in the Department of Anatomy. Mr. Landacre, Mr. Knouff, Mr. Baker.

The student may continue a problem assigned in Anatomy 804 or may be assigned a new problem in some subject in anatomy other than embryology.

806. Anatomical Problems. Five credit hours. Spring Quarter. One lecture and eight laboratory hours each week. Prerequisite, two years of biological science, of which one must be in a subject listed in the Department of Anatomy. Mr. Landacre, Mr. Knouff, Mr. Baker.

The student may continue a problem assigned in Anatomy 804 or 805 or may be assigned a new problem.

ANCIENT ART

(See Greek Language and Literature)

ANIMAL HUSBANDRY

Office, Animal Husbandry Building

PROFESSORS GAY, PLUMB, KAYS, COFFEY, AND SALISBURY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in animal husbandry in addition to any prerequisites stated in the description of the courses. Course 609 requires also an acceptable course in zoology.

601. Horse Production and Management. Five credit hours. Winter Quarter. Three lectures and two two-hour laboratory periods each week. Mr. Kays.

A consideration of the breeds and breeding, the feeding and management of horses in the stud and at work; the horse as a power unit. The laboratory exercises include practice judging and management sessions which are planned with the problems of the horse breeder and the employer of horse labor in mind.

602. Beef Cattle Production and Management. Five credit hours. Autumn Quarter. Three lectures and two two-hour laboratory periods each week. Mr. Gay.

A general consideration of the breeds of beef cattle together with a study of the leading bloodlines, the history, adaptability, and economic importance of each breed. The management of pure-bred and commercial herds, the selection of feeders, and the feeding of steers under various conditions.

603. Swine Production and Management. Five credit hours. Autumn Quarter. Three lectures and two two-hour laboratory periods each week. Mr. Coffey.

This course deals with the selection, feeding, and management of swine. In the lecture work about two-thirds of the time is devoted to feeding and management and the other one-third to bloodline discussions for the different breeds. In the laboratory work the judging of individuals and breed type study occupies a major portion of the time. At least two rather extensive trips for purposes of visiting herds over the State will be required in this course.

604. Dairy Cattle Production and Management. Five credit hours. Spring Quarter. Three lectures and two two-hour laboratory periods each week. Mr. Salisbury.

A study of the history of each of the breeds together with the leading bloodlines that are producing cattle of outstanding individuality and heavy production; the adaptability and characteristics of each breed. Feeding and management of the calf, growing stock, and mature cattle; feeding for high production, fitting cattle for shows and sales.

605. Sheep Production and Management. Five credit hours. Spring Quarter. Three lectures and two two-hour laboratory periods each week. Mr. Plumb.

Text, supplemented by lectures, covers the breeds, breeding, feeding, wool production, and general management. The laboratory periods include practice in care and management of the flock on rather a wide basis, involving feeding, construction of equipment for the stable, treatment for diseases and parasites, butchering and cutting up the carcass, shearing, visiting the Ohio Sheep and Wool Growers' wool warehouse, judging, etc.

606. Advanced Live Stock Judging. Five credit hours. Autumn Quarter. Two four-hour and one two-hour laboratory periods each week. Prerequisites, Animal Husbandry 601, 602, 603, and 605. Mr. Kays.

An advanced class for Seniors who have had elementary work in judging and who desire additional judging experience. Type studies in case of horses, cattle, sheep, and swine, also practice judging in groups will occupy the time.

607. Meats and Meat Products. Five credit hours. Winter Quarter. Two lectures and three two-hour laboratory periods each week. Prerequisites, Animal Husbandry 602, 603, and 605 and permission of the instructor. Enrollment is limited to fifteen. Mr. Gerlaugh.

A study of the composition and value of meats, the slaughtering of farm animals and the methods of handling and preparing meats and the by-products of slaughter. Particular attention is paid to the curing of pork. The relation of the live animal to the dressed carcass is also carefully considered.

608. Live Stock Markets and Marketing. Five credit hours. Autumn Quarter. Five lectures each week. Mr. Plumb.

The live stock markets, their organization methods and rules; methods of shipment and sale, etc. Considerable library work and investigation is required, and the course is handled after the manner of the seminary.

609. Breeding Live Stock. Five credit hours. Winter Quarter. Four lectures and one two-hour laboratory period each week. Mr. Gay.

The physiology of reproduction, growth, and development. Variation and heredity in their relation to live stock improvement; close breeding, cross breeding, and grading;

prepotency, pedigree, and selection. Laboratory: Study of the methods and achievements of the master breeders; practice in tracing pedigrees; reports and discussions of assignments covering current events and research in the field of live stock breeding.

701. Special Problems. Three to fifteen credit hours. Given in units of three to five hours a Quarter, for one or more Quarters. Autumn, Winter, Spring. Open to graduate students majoring in animal husbandry. Mr. Gay, Mr. Plumb, Mr. Kays, Mr. Coffey, Mr. Salisbury.

Special problems in any of the lines of animal production, or in breeding, feeding, and marketing live stock or meats. Students will elect work in desired subjects after conference with the instructor in charge.

NOTE: Students desiring work in animal nutrition, see Agricultural Chemistry 601, 607, 608.

FOR GRADUATES

Prerequisite for Graduate Work: As a prerequisite for a graduate major in this department the student must have had at least two years' study of the types and breeds of live stock, with collateral work in the principles of breeding and feeding.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Research Work. Three to fifteen credit hours, in units of three to five hours a Quarter, for one or more Quarters. Mr. Gay, Mr. Plumb, Mr. Kays, Mr. Coffey.

Research problems in any of the lines of animal production or in breeding, feeding, and marketing live stock or meats.

APPLIED OPTICS

Office, 206 Mendenhall Laboratory

PROFESSOR MINCHIN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Acceptable courses in physics, mathematics, and applied optics in addition to any prerequisites stated in the description of the courses.

601. Advanced Applied Optics. Four credit hours. Autumn Quarter. Lectures and laboratory work. Mr. Minchin.

Theory and application of optical instruments used in practice. A discussion of thick lenses involved in such instruments.

Illumination and vision, color and color vision, principles of physiologic optics.

602. Advanced Applied Optics. Four credit hours. Winter Quarter. Lectures and laboratory work. Prerequisite, Applied Optics 601. Mr. Minchin.

A continuation of subject matter as given under Applied Optics 601.

603. Advanced Applied Optics. Four credit hours. Spring Quarter. Lectures and laboratory work. Prerequisite, Applied Optics 602. Mr. Minchin.

A continuation of subject matter as given under Applied Optics 601 and 602.

ART

(See Fine Arts)

ASTRONOMY

Office, Emerson McMillin Observatory

PROFESSOR MANSON, ASSISTANT PROFESSOR MENZEL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: An acceptable course in calculus in addition to any prerequisites stated in the description of the courses.

601. Practical Astronomy. Three credit hours. Spring Quarter. The time is divided among lecture, quiz, and laboratory periods as seems convenient. Mr. Manson.

The course consists of a consideration of the problems of the determination of latitude, time and azimuth from observations of the stars or sun with enough astronomical theory to make possible an intelligent understanding of the methods used. A part of the laboratory work consists of the necessary observations of the stars and sun, and a part consists of reduction of these observations under supervision.

***602. Geodesy and Least Squares.** Three credit hours. One Quarter. Three lecture or quiz periods each week. Mr. Manson.

A discussion of the method of least squares with special emphasis on its application to geodetic problems. Also a discussion of certain problems of geodesy; especially the calculation of geodetic positions.

605. Introduction to Celestial Mechanics. Five credit hours. Autumn Quarter. Students electing Astronomy 605 are advised to take either before this course or concurrently with it a course in differential equations. Mr. Manson.

A discussion of rectilinear motion under the law of inverse squares and under the law of direct distance; central forces, including the character of the orbit under different laws of attraction; the potential and attraction of bodies; the problem of two bodies, including the computation of positions of planets and comets.

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* Not given in 1926-1927.

606. Introduction to Celestial Mechanics. Five credit hours. Winter Quarter. Prerequisite, Astronomy 605 or equivalent. Mr. Manson.

A discussion of the determination of the orbits of planets and comets; the general integrals of the problems of "n" bodies and an introductory discussion of the problems of three bodies, lunar theory and perturbations.

607. Advanced Astronomy. Three or five credit hours. One Quarter. Autumn and Spring. The time is divided among lecture, quiz, and laboratory periods as seems convenient. Students electing this course should consult the instructor regarding prerequisites. Mr. Manson, Mr. Menzel.

This course together with Astronomy 608, which is a continuation of it, is designed for students who wish to take advanced work in astronomy other than that given in Astronomy 603-604 or in 605-606. The course will be adapted to the desires and capabilities of the students electing it.

608. Advanced Astronomy. Three or five credit hours. Winter Quarter. Mr. Manson.

This course is a continuation of Astronomy 607, or by special permission may be taken by students who have not taken Astronomy 607.

609. Stellar Astronomy. Five credit hours. Autumn Quarter. The time is divided between lecture and laboratory periods as seems convenient. Prerequisites, ten hours of general astronomy, trigonometry, and either high school or college physics. (Advanced students in physics will be admitted without astronomy.) Mr. Menzel.

This course together with Astronomy 610, which is a continuation of it, consists of a discussion of the atomic theory, spectroscopy, and important physical principles with particular emphasis on their relation to the stars. The following topics are covered: the sun, stars, stellar motions, binary stars, nebulae, star-clusters, the galaxy, stellar evolution and the relation of these to the physical universe.

610. Stellar Astronomy. Five credit hours. Winter Quarter. Prerequisite, Astronomy 609. Mr. Menzel.

This course is a continuation of Astronomy 609.

BACTERIOLOGY

Office, 202 Veterinary Laboratory Building

PROFESSORS MORREY AND STARIN, ASSISTANT PROFESSOR SPEER, MR. JUKES, MR. BOND, MR. McCRIMMON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in chemistry and the biological sciences in addition to any prerequisites stated in the description of the courses.

607. General Bacteriology. Five credit hours. One Quarter. Autumn and Spring. Two class periods and three three-hour laboratory periods each week. Mr. Morrey, Mr. Speer, Mr. Jukes, Mr. Bond, Mr. McCrimmon.

This course is a prerequisite to all elective courses in the department and is designed to prepare for special work. The lectures consider the botanical relationships of bacteria, their morphology, classification, effect of physical and chemical environment, action on food material, etc. The laboratory work includes preparation of the ordinary culture media and making of cultures on these media, staining methods, and some typical biochemical actions.

608. Pathogenic Bacteria. Three credit hours. Winter Quarter. Three class periods each week. Prerequisite, Bacteriology 607. Mr. Morrey.

A study of the more important bacteria producing disease in man; ways of transmission and methods of protection against infectious diseases; sanitation and the theories of immunity.

609. Pathogenic Bacteria. Three credit hours. Winter Quarter. Three three-hour laboratory periods each week. Prerequisite, Bacteriology 607. Mr. Morrey, Mr. Jukes, Mr. Bond, Mr. McCrimmon.

Laboratory work on the more important bacteria producing disease in man, including cultural and staining properties, methods of diagnosis, animal inoculation.

610. Dairy Bacteriology. Three credit hours. Winter Quarter. Three class periods each week. Prerequisite, Bacteriology 607. Mr. Morrey.

Sources of bacteria in milk. Methods of avoiding them. Kinds of bacteria in milk. Abnormalities of milk and their prevention. Disease bacteria and milk. Uses of bacteria in butter making. Abnormalities of butter and their prevention. Uses of bacteria and fungi in cheese making. Abnormalities of cheese and their prevention. Bacteria in oleomargarine and ice cream.

611. Dairy Bacteriology. Three credit hours. Winter Quarter. Three three-hour laboratory periods each week. Prerequisite, Bacteriology 607. Mr. Morrey, Mr. Speer.

Laboratory work on the organisms discussed in Bacteriology 610.

***612. Soil Bacteriology.** Three credit hours. Spring Quarter. Three class periods each week. Prerequisite, Bacteriology 607. Mr. Morrey.

Source and kinds of bacteria in the soil. Bacteria in relation to the nitrogen problem, ammonification, nitrification, nitrogen absorption, denitrification. Bacteria in relation to sulphur, to carbon, to phosphorus. Bacteria and mineral salts. Soil fertility and bacteria. Disease bacteria of the soil.

***613. Soil Bacteriology.** Three credit hours. Spring Quarter. Three three-hour laboratory periods each week. Prerequisite, Bacteriology 607. Mr. Morrey.

Laboratory work on the organisms discussed in Bacteriology 612.

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* Not given in 1926-1927.

614. Water Examination, Sewage Disposal, Water Filtration. Three credit hours. Winter Quarter. Three class periods each week. Prerequisite, Bacteriology 607. Mr. Morrey.

A study of the organisms concerned in these processes. The modern water filtration and sewage disposal plants of the city of Columbus afford most excellent opportunities for practical demonstration and also for study of special problems.

615. Water Examination, Sewage Disposal, Water Filtration. Three credit hours. Winter Quarter. Three three-hour laboratory periods each week. Prerequisite, Bacteriology 607. Mr. Morrey.

Laboratory work on the organisms discussed in Bacteriology 614.

***616. Bacteriological Chemistry.** Three credit hours. Spring Quarter. Three class periods each week. Prerequisite, Bacteriology 607. Mr. Morrey.

Enzymes and the theory of their action. Technical uses of bacteria and fungi in the fermentation and allied industries.

***620. Bacteriological Chemistry.** Three credit hours. Spring Quarter. Three three-hour laboratory periods each week. Prerequisite, Bacteriology 607. Mr. Morrey.

Laboratory work in connection with Bacteriology 616.

617. Immunity and Serum Therapy. Three credit hours. One Quarter. Autumn and Spring. Three class periods each week. Prerequisites, Bacteriology 607, 608, and 609, or equivalents. Mr. Starin.

A discussion of the general principles of immunity, including toxins and antitoxins, bactericidal substances, agglutinins, precipitins, opsonins, etc.

618. Immunity and Serum Therapy. Three credit hours. One Quarter. Autumn and Spring. Three three-hour laboratory periods each week. Prerequisites, Bacteriology 607, 608, and 609, or equivalents. Mr. Starin.

Laboratory work in the preparation of toxins, antitoxins, antibacterial substances, bacterial vaccines, and in the serological methods of diagnosis.

619. Pathogenic Protozoa. Three credit hours. Spring Quarter. Three class periods each week. Prerequisites, Bacteriology 607, 608, and 609, or equivalents. Mr. Starin.

The various protozoal diseases are considered, with special attention to trypanosomiases, piroplasmoses, and spirochaetoses.

621-622-*623. Advanced Dairy Bacteriology. Five credit hours. Autumn, Winter, Spring Quarters. Prerequisites, Bacteriology 607, 610, and 611. Mr. Morrey.

Research in any of the lines discussed in Bacteriology 610.

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* Not given in 1926-1927.

625-626. Special Technique in Pathogenic Bacteriology. Five credit hours. Autumn and Winter Quarters. Conferences, library, and laboratory work. Prerequisites, Bacteriology 607, 608, and 609, or equivalents. Mr. Starin.

A course in technique in which the student is thoroughly trained in working with such material and methods as are encountered in board of health and hospital laboratories.

627. Special Problems in Pathogenic Bacteriology. Five credit hours. Spring Quarter. Conferences, library, and laboratory work. Prerequisites, Bacteriology 607, 608, 609, 625, and 626 or equivalents. Mr. Starin.

628-629-*630. Advanced Soil Bacteriology. Five credit hours. Autumn, Winter, Spring Quarters. Prerequisites, Bacteriology 607, 612, and 613. Mr. Morrey.

Research in any of the lines discussed in Bacteriology 612.

FOR GRADUATES

Prerequisite for Graduate Work: Students intending to specialize in bacteriology should take, in addition, courses in botany, pathology, anatomy, physiology, zoology, dairying, or soils (subject depends on the line of specialization) and a second year in chemistry, which should include organic chemistry, if possible.

As a prerequisite to each of the following courses the prospective student must have had at least two years' work in bacteriology, one of which must have been along the lines of the course selected.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Research Work in Pathogenic Bacteriology. Five to ten credit hours. Autumn, Winter, Spring Quarters. Mr. Morrey, Mr. Starin.

804-805-*806. Research Work in Agricultural or in Technical Bacteriology. Five to ten credit hours. Autumn, Winter, Spring Quarters. Mr. Morrey.

BOTANY

Office, 102 Botany and Zoology Building

PROFESSORS TRANSEAU, SCHAFFNER, STOVER, AND SAMPSON, ASSISTANT PROFESSORS WALLER, TIFFANY, AND SAYRE, MR. DOBBINS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in botany and biological science in addition to any prerequisites stated in the description of the courses. Courses 617, 633, and 634 require also a course in plant physiology; 655, 657, and 659 a course in plant pathology.

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* Not given in 1926-1927.

601. Plant Ecology. Five credit hours. Autumn Quarter. Three lectures and one four-hour laboratory period each week. Mr. Transeau.

Lectures on the vegetation of the Eastern United States with special reference to the plant associations and formations of Ohio. Field work on the associations of the vicinity of Columbus and their successions. Reading of important literature.

602. Plant Ecology. Five credit hours. Spring Quarter. Three lectures and one four-hour laboratory period each week. Prerequisite, Botany 601. Mr. Transeau.

General principles of ecological plant geography. A discussion of associations and successions of the major divisions of the vegetation of North America. Assigned readings of the more important literature. Several Saturday field trips.

607. Principles of Taxonomy: Pteridophytes and Gymnosperms. Five credit hours. Autumn Quarter. Two lectures and six laboratory hours each week. Mr. Schaffner.

A detailed study of phylogeny and evolutionary series based on floral structure and organography.

608. Principles of Taxonomy: Monocotyls. Five credit hours. Winter Quarter. Two lectures and six laboratory hours each week. Prerequisite, Botany 607. Mr. Schaffner.

A study of the groups of monocotyls with special consideration of the taxonomy of the grasses and of the lack of correlation between taxonomic characters and environment.

609. Principles of Taxonomy: Dicotyls. Five credit hours. Spring Quarter. Two lectures and six laboratory hours each week. Prerequisite, Botany 608. Mr. Schaffner.

A general consideration of all the groups of dicotyls, of the origin of angiosperms, and of the progressive or serial development of characters.

611. Evolution of Plants. Five credit hours. Spring Quarter. Lectures and assigned readings. Mr. Schaffner.

The progress of evolution in the plant kingdom with a general discussion of the problems and factors involved, including both the scientific and philosophical aspects of the subject.

617. Plant Microchemistry. Five credit hours. Autumn Quarter. One lecture and four two-hour laboratory periods each week. Desirable antecedents, general inorganic and organic chemistry. Mr. Sampson.

The identification *in situ* of organic and inorganic substances found in plant tissues by microchemical methods. These methods are of special value in determining plant substances within the cells and in the study of physical and chemical changes accompanying plant processes and plant responses. This applies particularly to the numerous local regions in plants too small to be attacked by the test-tube method of tissue analysis.

619. Economic Botany. Five credit hours. Autumn Quarter. Three lectures and two two-hour laboratory periods each week. Desir-

able antecedents, commercial geography and plant and animal ecology. Mr. Waller.

The world's food resources are examined in the light of botanical problems involving geographic distribution of economic plants. A summary is made of the centers of production of food-producing plants and the relation of these centers to natural plant formations is discussed. Trips to various industrial concerns utilizing plant materials are combined with laboratory examination of plant products.

620. Economic Botany. Five credit hours. Winter Quarter. Four lectures and one two-hour laboratory period each week. Desirable antecedents, commercial geography and plant and animal ecology. Mr. Waller.

The fiber and oil producing plants and the forest products are discussed in this course. The same ecological and economic principles discussed in the previous course are applied, and an analysis is made of trade relations of the products to natural environmental factors governing the distribution of the plants. Visits are made to the industrial establishments using the materials discussed.

633. Physiological Methods. Three credit hours. Winter Quarter. Three two-hour laboratory periods each week. Desirable antecedents, plant chemistry and plant microchemistry. Consult instructor before registering. Mr. Sayre.

A laboratory course of methods in plant physiology such as the determination of osmotic pressure; H-ion concentration and buffer action of plant juices; the swelling of plant colloids; permeability of plant membranes; carbon dioxide-oxygen ratios; and the measurement of transpiration, growth, and environmental factors.

634. Plant Growth. Three credit hours. Spring Quarter. Three lectures each week. Consult instructor before registering. Mr. Sampson.

A study of the physiology of growth. Special attention is given to the interrelated effects of internal and external factors upon growth, movement and reproduction in plants. Bibliographies and reviews of literature.

635. Experimental Plant Genetics. Five credit hours. Spring Quarter. Two lectures and three two-hour laboratory periods each week. Mr. Schaffner.

Special emphasis will be placed on fluctuation and the varying expression of hereditary factors in respect to vegetative maturity, size, form, structure, and sexual states, through the influence of environment. Also problems of self and cross pollination and their practical application to selected types of economic plants. Spring Quarter in alternate years.

***640. Plant Anatomy.** Five credit hours. Spring Quarter. Two lectures and three two-hour laboratory periods each week.

The origin and development of the organs, and tissue systems of vascular plants, and comparative study of the structures of roots, stems, leaves, flowers, and fruits. This course is a desirable antecedent to advanced work in physiology and pathology.

651. Experimental Plant Pathology. Three credit hours. Spring Quarter. One lecture and two three-hour laboratory periods each week.

* Not given in 1926-1927.

Prerequisite, an acceptable course in general plant pathology; desirable antecedent, Bacteriology 607. Mr. Stover, Mr. Dobbins.

A number of bacterial, fungous and virus diseases of plants are studied experimentally in the laboratory and greenhouse. The methods employed in research on plant diseases are emphasized. These include the preparation of culture media, the isolation and culture of organisms causing plant diseases, methods of inoculation, and sectioning and staining diseased tissues.

653. Mycology. Five credit hours. Winter Quarter. Three lectures and two two-hour laboratory periods each week. Mr. Stover, Mr. Dobbins.

A survey is given of the principal groups of the fungi, including a study of their structure, classification, cytology, reproduction, and life histories. Some attention is given to edible and poisonous mushrooms, to the fungi causing decay of timber, and to other fungi of economic importance, such as those causing fermentation, the ripening of cheese, the spoiling of food, and the diseases of fish, insects, and plants.

655. Diseases of Fruit Crops. Three credit hours. Autumn Quarter. One lecture and two two-hour laboratory periods each week. Mr. Stover.

A study of the field, transportational and storage diseases of orchard and small fruits with especial reference to the cause, symptoms, life history of the causal organism in relation to disease, and control measures.

657. Diseases of Garden Crops. Three credit hours. Winter Quarter. One lecture and two two-hour laboratory periods each week. Mr. Stover.

The diseases of the more important garden and truck crops are studied on the general plan followed in Botany 655. Attention is given also to the relation of various cultural practices to the occurrence of certain diseases.

659. Diseases of Farm Crops. Three credit hours. Spring Quarter. One lecture and two two-hour laboratory periods each week. Mr. Dobbins.

The diseases of cereal, forage, and miscellaneous field crops are studied on the general plan followed in Botany 655.

661. Advanced Mycology. Three credit hours. Autumn Quarter. One lecture and two two-hour laboratory periods each week. Prerequisite, Botany 653. Mr. Stover.

An intensive study is made of the fungous groups, both in the field and laboratory, with considerable attention to the identification of species and to an acquaintance with mycological literature. The preparation of a herbarium is encouraged.

***670. Advanced Plant Genetics.** Five credit hours. Winter Quarter. Three lectures and two two-hour laboratory periods each week. Prerequisite, Botany 635. Given biennially. Mr. Schaffner.

The principles and methods of plant genetics with a consideration of fluctuations, mutations, Mendelian phenomena and cytology, the nature of sexuality, and the relation of the plant life cycle to practical genetic problems.

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* Not given in 1926-1927.

701. Special Problems: Taxonomy. Two to five credit hours. Mr. Schaffner, Mr. Transeau, Mr. Stover, Mr. Tiffany.

702. Special Problems: Morphology. Two to five credit hours. Mr. Schaffner.

703. Special Problems: Physiology and Ecology. Two to five credit hours. Mr. Transeau, Mr. Sampson, Mr. Waller, Mr. Sayre, Mr. Tiffany.

704. Special Problems: Pathology and Mycology. Two to five credit hours. Mr. Stover, Mr. Dobbins.

705. Special Problems: Economic Botany. Two to five credit hours. Mr. Waller.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 705.

FOR GRADUATES

Prerequisite for Graduate Work: Permission to major in botany will be granted only to those students who have had a thorough preparation in general botany, plant physiology, and plant morphology. Candidates for the degree of Doctor of Philosophy should have had courses in plant ecology, taxonomy, and plant pathology. Students majoring in plant pathology should have had acceptable courses in microchemistry, bacteriology, and plant genetics, in addition to the undergraduate courses in pathology. Advanced work in plant physiology presupposes at least an elementary course in organic chemistry.

For a number of special lines of work which may be elected as majors or minors in botany, unusual facilities are at hand for making advantageous combinations with other departments of the University. With plant physiology, suitable courses may be elected in physical and organic chemistry, and in soil investigations. With plant pathology, various courses in entomology and bacteriology are available and also in horticulture and soils. With morpohology or taxonomy, related courses in zoology may be elected.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Research in Systematic Botany. Three to ten credit hours. Autumn, Winter, Spring Quarters. Laboratory open daily. Mr. Schaffner.

802. Research in Morphology and Cytology. Four to ten credit hours. Autumn, Winter, Spring Quarters. Laboratory open daily. Mr. Schaffner.

803. Research in Physiology and Ecology. Four to ten credit hours. Autumn, Winter, Spring Quarters. Laboratory open daily. Mr. Transeau, Mr. Sampson, Mr. Waller.

804. Research in Mycology and Plant Pathology. Four to ten credit hours. Autumn, Winter, Spring Quarters. Laboratory open daily. Mr. Stover.

805. Research in Genetics. Four to ten credit hours. Autumn, Winter, Spring Quarters. Laboratory open daily. Mr. Schaffner, Mr. Waller.

806. Research in Economic Botany. Four to ten credit hours. Autumn, Winter, Spring Quarters. Laboratory open daily. Mr. Waller.

810. Botanical Seminary. One credit hour. Autumn, Winter, Spring Quarters. Required of all graduate students majoring in botany. All instructors.

BUREAU OF EDUCATIONAL RESEARCH

Office, Education Building

PROFESSORS BUCKINGHAM, ASHBAUGH, AND CLIFTON, ASSISTANT PROFESSOR STEVENSON

The purpose of the Bureau of Educational Research is to promote the scientific investigation of educational problems both at the University and in the public schools of the State. It constitutes an agency for cooperative effort among all the school people of Ohio. The facilities of the Bureau are available to all students, faculty members, and school people of Ohio.

Library. The research library contains large quantities of material in the form of manuscripts, pamphlets, bulletins, reports, modern textbooks for elementary and high-school grades, and educational periodicals. This library is in charge of a reference librarian, and her services together with the library material will be utilized in the preparation of bibliographies and reports on problems presented by those engaged in educational work. This applies to students and faculty members as well as those engaged in the work of the public schools. Unless the problem requires extensive investigation, this service will be rendered gratis.

Courses. In order to make the resources of the Bureau serve for research purposes, students desiring to work in the Bureau may register in certain courses listed in the departments of School Administration,

Psychology, and Principles and Practice of Education. Courses must be approved by the head of the particular department and by the Director of the Bureau. Such students will be under the direction and supervision of the Bureau staff.

Research Problems. Students taking such courses will be given a practical problem upon which to work. There will be no regular recitation periods, but the student will be in a position to confer with the Bureau staff whenever advisable. According to the nature and exacting character of the problem and the scholastic status of the student, he may be registered in either of two groups of courses, as follows:

MINOR PROBLEMS. Two to four credit hours. Investigation of minor problems.
Psychology 650
Principles and Practice of Education 650, 651, 652, and 653
School Administration 617, 618, 619, and 620

MAJOR PROBLEMS. Three or more credit hours. Investigation of problems leading to preparation of theses for advanced degrees.
Psychology 801
Principles and Practice of Education 850, 851, 852, and 853
School Administration 804, 805, 806, and 807

NOTE: Descriptions of these courses will be found under the department announcements.

BUSINESS ORGANIZATION

Office, 115 Commerce Building

PROFESSORS RUGGLES, HAGERTY, WEIDLER, FISHER, HOAGLAND, ECKELBERRY, MAYNARD, DICE, AND HELD, ASSISTANT PROFESSORS PIKE, REEDER, NELSON, DAVIS, BECKMAN, SHIVELY, AND BUCHANAN, MR. CROXTON, MR. SMART, MR. TERBORGH, MR. STARR

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: A fundamental course in economics in addition to any prerequisites stated in the description of the courses. Course 692 requires also a course in engineering drawing.

604-605. Business Communications and Adjustment Practice. Three credit hours. Two Quarters. 604, Autumn, Winter, Spring; 605, Winter. Mr. Held.

The principles of effective writing; the requirements of a satisfactory business letter, application for positions; credit, collection, sales and promotion correspondence; form letters and form paragraphs. An historical treatment of claims and complaints. Analysis of the present problem of adjustments in such fields as wholesaling, retailing, mail order business, etc. Current method of handling adjustments, by personal conference and correspondence. Administration of adjustments through a separate department; and association with collections or other departments.

606-607. Secretarial Problems. Three credit hours. Winter and Spring Quarters. Prerequisite, the permission of the instructor. Mr. Held.

Duties and problems of secretaries of chambers of commerce, merchants' and manufacturers' associations, and organizations of similar nature, together with a study of the equipment of such offices.

614. Business Statistics. Three credit hours. One Quarter. Winter and Spring. Two lectures and one two-hour laboratory period each week. Prerequisite, Economics 622. Mr. Smart.

The use of graphic charts for presenting business data. The analysis of frequency distributions. Index numbers of price and quantity. The problems of secular trend and seasonal variation. Simple correlation and correlation of time series.

*615. Industrial Statistics. Three credit hours. Spring Quarter. Two lectures and one two-hour laboratory period each week. Prerequisite, Economics 622. Mr. Croxton.

Special emphasis upon the use of graphic charts for executive control and advertising. The analysis of time series and frequency distribution. Measurements of variation and correlation.

This course is not open to students who have credit for Business Organization 614.

621. Business Law: Contracts. Three credit hours. One Quarter. Autumn, Winter, Spring. Mr. Power.

A course in the law of contracts for the student of business. A study of the fundamentals of legally binding agreements between persons, and their enforcement; including a study of the making of the contract, consideration, the effect of fraud, duress, undue influence, mistake, illegality, and the statute of frauds, interpretation discharge and remedies.

623. Business Law: Agency and Sales. Three credit hours. One Quarter. Autumn, Winter, Spring. Prerequisite, Business Organization 621. Mr. Pike.

A course in the law of agency and sales for the student of business. The fundamentals of the law governing business transactions of persons through agents and the sale of personal property. A continuation of Business Organization 621.

625. Business Law: Negotiable Instruments. Three credit hours. One Quarter. Autumn, Winter, Spring. Prerequisite, Business Organization 621. Mr. Bowers.

A course in the laws governing bills of exchange, promissory notes and checks designed to guide the business man in his daily transactions with such instruments.

627. Business Law: Partnerships and Corporations. Three credit hours. Spring Quarter. Prerequisites, Business Organization 621 and 623. Mr. Pike.

A course designed to give the student of business a practical working knowledge of important laws governing the formation and operation of partnerships and corporations.

* Not given in 1926-1927.

629. Business Law: Legal Aspects of Credits and Collections. Three credit hours. One Quarter. Autumn and Winter. Three recitations each week. Prerequisite, Business Organization 621. Mr. Pike.

The work includes in part a study of instruments of credit, forms of security, the pledge, real estate mortgage, chattel mortgage, conditional sale, laws governing their execution and priorities; legal instruments of collection, judgments, executions, judgment liens, mechanics and material men's liens; assignments for creditors, transfers in fraud of creditors, receiverships, bankruptcy, account books and other books as evidence, the bulk sales law, reports to credit agencies, laws of Ohio governing the execution and priorities of the various liens and other subjects mentioned.

***631. Business Law: The Law of Banks and Banking.** Three credit hours. Winter Quarter. Three recitations each week. Prerequisites, Business Organization 621 and 625. Mr. Pike.

The work includes in part a study of the laws governing the bank and the borrower, the bank and the depositor, the bank and its customer; trusts, their creation and management, wills, estates, and probate practice, property and conveyancing, suretyship, statutes governing creation and operation of banks and trust companies, bank failures, stockholders, legal aspects of collateral security contracts and the sale of stocks and bonds, bankruptcy, etc.

640. Business Organization and Control. Three credit hours. One Quarter. Autumn, Winter, Spring. Three recitations each week. Mr. Hoagland, Mr. Nelson, and assistant.

Business enterprise; types; structure; incorporation; charter; by-laws; security certificates; indentures; organization meetings; directors and officers; duties; obligations; committees; control by stockholders and bondholders; proxies; voting trusts; minority stockholders' rights; expansion; intercorporate relations; consolidations; methods; advantages and disadvantages; community of interest; contractural relationships; reorganization; liquidation; legislation and court decisions affecting organization and management of business; Federal Trade Commission.

642-643. Real Estate Principles and Practice. Three credit hours. Two Quarters. 642, Autumn and Spring; 643, Winter. Three hours lecture and quiz each week. Prerequisite to 642, ten hours in the principles of economics. Prerequisite to 643, Business Organization 642. Business Organization 642 may be taken separately. Mr. Hoagland.

The first Quarter's work constitutes a survey course covering the general field of the real estate business.

The second Quarter deals with problems of real estate appraisals and finance.

The content of each Quarter is intended to be of practical use to the purchaser, seller or occupant of real estate as well as to the one who intends to engage in the real estate business.

645. Trade Associations. Three credit hours. Winter Quarter. Three recitations each week. Mr. Nelson.

Nature and purposes of trade associations; historical evolution; types; organization (single associations, multiple secretaryships, federated associations, federations of associations); branches; methods of financing; functions (commercial, industrial, tech-

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* Not given in 1926-1927.

nical, statistical, protective, etc.); meetings; administration (qualifications of secretary, procedure, etc.); relations with labor, other industries, governmental agencies, etc.; Federal Trade Commission; laws and court decisions affecting trade associations.

650. Corporation Finance. Five credit hours. One Quarter. Autumn, Winter, Spring. Two lectures and three quiz periods each week. Mr. Hoagland, Mr. Nelson, Mr. Donaldson.

Financial structure and problems of modern business corporations; common types of securities; promotion, including parts played by promoter, investment banker and his organization, syndicate, security dealer; determination, management, and distribution of surplus; financial problems of expansion, including changes in financial plans; securing funds for expansion; failure of corporations and resulting reorganization or liquidation; financial results of reorganization.

This course is not open to students who are taking Economics 616.

652. Industrial Finance. Three credit hours. Spring Quarter. Three recitations each week. Prerequisite, Business Organization 650. Mr. Hoagland.

Obtaining funds for capital accounts; capitalization and valuation; factors governing financial plan; functions and methods of banking houses in financial corporations; syndicate operations; joint accounts, underwriting; wholesaler and retailer; security markets; working capital from banks, open markets, trade acceptance, miscellaneous sources; financial plan and purchasing, production, selling policies; subsidiaries; assumed obligations; financing mergers and consolidations; ammortization; readjustments of capital account.

656. Railroad and Public Utility Finance. Three credit hours. Winter Quarter. Three recitations each week. Prerequisite, Business Organization 650. Mr. Hoagland.

Financial problems peculiar to public utilities and railroads. Basis of investment: promotion; construction finance; supplementary capitalization; financing equipment; financial management; control of surplus; finance and accounts; intercorporate relationships; consolidations; collateral issues; pyramiding of capitalization; public utility holding company; insolvency; receivership; reorganization; financial problems of nonoperating property; government regulation of security issues; government partnership; financial problems of government ownership and operation.

658. Investments. Three credit hours. One Quarter. Autumn and Spring. Three recitations each week. Prerequisite, Economics 616 or Business Organization 650. Mr. Hoagland, Mr. Nelson.

This course covers the field of investment in a broad, general way. Students interested in more fundamental consideration of corporation investment problems should look to Business Organization 652 and 656.

Nature and laws of investment; mechanism, types, and tests; load factor; investment markets; economic conditions affecting investments; investment opportunities; classification of securities with respect to strategic positions as investments; security behind investments; allocation of earnings; methods of protecting investors; government securities; domestic and foreign; real estate mortgages; miscellaneous investments; financial news; sources of information; legal restrictions upon investments.

*659. **Bond House Organization and Management.** Three credit hours. Spring Quarter. Three recitations each week. Prerequisite, Business Organization 650. Mr. Hoagland.

Bonds as instruments of finance, public and private; growing importance of bond business; classes of bond houses; functions of bond houses—selective, distributive, protective—purchasing, selling, advisory; types and methods of organization; bond houses as fiscal agents; underwriting; syndicate formation and operation; bond houses as reorganization agents; organization operation; organization and operation of Investment Bankers Association and its branches.

660. **The Stock Market.** Three credit hours. One Quarter. Autumn and Spring. Three recitations each week. Prerequisites, Economics 610 and Business Organization 650. Mr. Dice.

The organization of the speculative security market; its relation with the banking community and with the public; the work of brokerage houses; the methods of speculation; public regulation of the exchanges; the movement of stock prices; business cycles in their relation to speculation and investment; the forecasting of stock market conditions.

662. **The Money Market.** Three credit hours. Spring Quarter. Prerequisite, Economics 610. Mr. Dice.

A study of the development of New York as the money center of the United States; the work of the note broker; the commercial paper house; relation of the commercial paper house to the Federal Reserve System; interest and discount rates; movements of money. The significance of the money market to business; to the security market, and to foreign exchange; a consideration of the factors that promote the development of a world money market.

665. **Foreign Exchange.** Three credit hours. Winter Quarter. Three recitations each week. Prerequisite, Economics 610. Mr. Buchanan.

A study of the theory and practice of foreign exchange; the supply and demand for exchange; rates of exchange; exchange quotations; commercial and bankers' bills; dollar credits; the development of a foreign exchange market; the organization and management of the foreign exchange department of a bank; the relation of the foreign exchange department to business; foreign exchange in relation to public policies.

666-667-668. **Practice Work in Banking.** One to three credit hours. Autumn, Winter, Spring Quarters. Students are admitted on the suggestion of the instructor in charge in cooperation with the banks concerned. Mr. Dice.

Students taking this course will be engaged in actual work in a bank under the supervision of the head of the banking group. Each student will attend conferences in regard to his work and make reports based on the actual operations in the bank with which he is connected.

670-671. **Bank Organization and Management.** Three credit hours. Winter and Spring Quarters. Two discussion periods and one two-hour laboratory period each week during the Winter Quarter and three discussion periods each week during the Spring Quarter. Each Quarter

* Not given in 1926-1927.

may be taken separately. Prerequisites, Economics 610, Business Organization 650, and Accounting 616 (for 671). Mr. Dice, Mr. Eckelberry.

The Winter Quarter's work is a study of the formation of banking institutions; organization of the different departments of a bank; new business; the clearing system; the bank's reserves; the management of the bank's investments; the theory of bank liquidity; the application of the principles of accounting and auditing to the peculiar problems of banking; the books and records used; the construction of accounts; the preparation of statements and reports; the verification of balance sheet items, income and expense.

In the Spring Quarter is taken up the work of the loan and discount committee; the bank credit investigator; bank credit policies; methods of diversification of loans; buying commercial paper; collateral loans; the distribution of the bank's funds to meet seasonal and cyclical fluctuations in business.

674. Savings and Trust Functions of Banks. Three credit hours. Autumn Quarter. Three lectures and discussion periods each week. Prerequisite, Economics 610. Mr. Buchanan.

The services, operation, and administration of the savings and trust departments of banks, trust companies, and building and loan associations.

680. Industrial Organization and Management. Five credit hours. One Quarter. Autumn and Winter. Three lectures and two conferences each week. Mr. Fisher, Mr. Davis, and assistants.

The organization and management of industries, history, literature, and theory of industrial management. Kind and internal development of organization, dealing particularly with problems or interrelation of functions and the general duties of various functions. A general survey of the problems of the manufacturing or industrial executive within an organization without entering into detailed studies of specific problems of manufacturing.

Besides lectures and conference work a series of papers including a short-term paper will be required. These papers may call for a limited amount of outside investigation.

684. Industrial Management Field Work. Three to six credit hours. One Quarter. Autumn, Winter, Spring. Prerequisite, Business Organization 680. Mr. Fisher, Mr. Davis, and assistants.

Field work. This work should be a regular, productive job in an industry. The job must carry the approval of the instructor and be followed by a report both from the employer and the student.

685. Material Organization and Management. Three credit hours. One Quarter. Autumn and Winter. Two lectures and one conference each week. Prerequisite, Business Organization 680 or 681. Mr. Fisher.

The organization and management of the problem of materials in industries. A study of the organization and functions of the purchasing, stores, stores controlling departments and that part of the planning, accounting, production, and other departments which directly affect the control of materials. The problems involved and accepted methods of handling and moving materials.

Students will be required to do field work involving visits and inspection of industries and to write constructive reports and a term thesis.

686. Employment Organization and Management. Three credit hours. One Quarter. Autumn and Spring. Two lectures and one conference each week. Prerequisite, Business Organization 680 or 681. Mr. Davis.

The organization and management of the employment department and the personnel problems within an industry. Deals particularly with the functions and problems which come within the scope of employment manager; such as, hiring, force maintenance, industrial education and welfare. Does not deal with questions of labor organization except in so far as is necessary for proper conception of these problems within an industry.

Students will be required to do field work involving visits and inspection of industries and to write constructive reports and a term thesis.

687. Production Organization and Management. Four credit hours. One Quarter. Winter and Spring. Two lectures, one conference, and two laboratory hours each week. Prerequisite, Business Organization 680 or 681. Mr. Fisher, Mr. Davis, and assistants.

The problems of organization and management incident to the successful control of production in industry. Treats these problems largely from the point of view of a production manager. Coordinates personnel, equipment, and material to produce the necessary justification of organization in maximum production at least cost.

Students will be required to do field work involving visits and inspection of industries and to write constructive reports and a term thesis.

691. Office Organization and Management. Four credit hours. One Quarter. Autumn and Winter. Two lectures, one conference and two laboratory hours each week. Mr. Fisher and assistants.

Administration of offices. Methods of pay. Office manager. Standards, tools, forms, equipment, office machinery. Standard methods. Files, ticklers, mail handling, dictation, messengers. Engineering features. Special office problems of different departments.

Students will be required to do sufficient field work to write a term thesis based on actual investigation.

692. Time and Motion Study. Three credit hours. One Quarter. Winter and Spring. Three recitations each week. Prerequisite, Business Organization 680 or 681. Mr. Davis.

Reviews methods of pay and of setting standards. Study of preliminary standardization. Observation work. Analysis of results. Fatigue analysis and other allowances. Setting tasks. Use of mechanical devices in time studies.

Course involves laboratory and field work to allow students to make studies under actual working conditions.

***693. Cost Accumulation and Analysis.** Three credit hours. Spring Quarter. Three recitations each week. Not open to students eligible to take Accounting 603-604. Mr. Fisher, Mr. Davis.

Deals with methods of accumulating direct and indirect cost data, the determination of the proper burden factor, the analysis of the resulting figures for engineers and executives, and balancing these figures with books of account. Deals with various reports and their practical use in increasing business efficiency.

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* Not given in 1926-1927.

695. Problems in Employment Organization and Management. One to three credit hours. Autumn Quarter. Two conferences each week. Prerequisite, the consent of the instructor. Registration is limited to fifteen members. Mr. Fisher, Mr. Davis, and assistants.

An advanced course for students with a particular interest and aptitude in personnel organization and management. Problems, usually involving actual field investigation, will be assigned in such subjects as analysis of employment data, job analysis, labor turnover, training employees, force maintenance, hiring and firing, welfare, etc.

Definite assignments will be given to each student or group of students and these topics will be the subjects of reports, term theses, and class conferences.

696. Problems in Production, Organization, and Management. One to three credit hours. Winter Quarter. Two conferences each week. Prerequisite, the consent of the instructor. Registration is limited to fifteen members. Mr. Fisher, Mr. Davis, and assistants.

This course deals particularly with production from the point of view of production executives. Problems usually involving actual field work will be assigned in such subjects as storage, control and arrangement of materials; flow of production, factory layout, continuous vs. departmental manufacturing; production control, maintenance, etc.

697. Industrial Problems. One to three credit hours. Spring Quarter. Two conferences each week. Prerequisite, the consent of the instructor. Registration is limited to fifteen members. Mr. Fisher, Mr. Davis, and assistants.

This course is designed to deal with problems of general industry such as organization analysis, inter-departmental relations, industrial budgets, schedule building, etc.

Definite assignments will be given to each student or group of students and these topics will be the subjects of reports, term theses, and class conferences.

700. Marketing. Five credit hours. One Quarter. Autumn, Winter, Spring. Five hours lecture and quiz each week. Mr. Hagerty, Mr. Weidler, Mr. Maynard, Mr. Beckman, Mr. Reeder, Mr. McGinnis.

The first part of the course will be devoted to the study of the marketing of raw materials, partially manufactured products and agricultural products. A critical consideration of marketing functions and institutions.

The second part of the course will be devoted to the study of the problems involved in marketing manufactured products. A study of the functions, methods, costs of marketing and marketing problems of the manufacturer, wholesaler or jobber, commission merchant, selling agent, broker, factor, and retailers of various types.

702-703. Marketing Problems. Three credit hours. Two Quarters. 702, Autumn, Winter, Spring; 703, Spring. Three lecture hours and quiz each week. Prerequisite to 702, Business Organization 700. Business Organization 702 may be taken separately. Mr. Hagerty, Mr. Weidler, Mr. Maynard, Mr. Beckman, Mr. Reeder.

The first Quarter's work will be devoted to a consideration of the marketing problems of manufacturers, jobbers, selling agents, commission merchants, factors, brokers, agents, and retailers. The case or problem method is used.

The second Quarter deals with the methods of market analysis. The use of the results of such analysis in determining distribution policies, and methods is discussed.

and the possibilities of the development of this method of marketing control are presented. Students will conduct actual market research as a part of the work of the course.

705-706. Retailing and Wholesaling. Four credit hours. Two Quarters. 705, Autumn, Winter, Spring; 706, Spring. Four lectures and discussion periods each week. Business Organization 705 may be taken separately. Prerequisite to 705, Business Organization 700. Prerequisite to 706, Business Organization 705. Mr. Weidler, Mr. Beckman.

The first Quarter's work will be devoted to a consideration of the organization and management of retail establishments. Store location; store organization; buying; receiving; stockkeeping; inventories; sales systems; store policies; services; expenses and profits; deliveries; personnel problems; etc.

The second Quarter deals with the wholesaler as a link in the chain of distribution; classes of wholesalers; tendencies in wholesaling; wholesale centers; radii of operation; the organization and management of wholesale establishments; location; organization; stock control; purchasing; receiving; pricing; inventories and stock records; sales systems and organizations; handling orders; shipping; credits and collections; house policies; dealer helps and other services; expenses; profits; etc.

709. Credits and Collections. Three credit hours. One Quarter. Autumn, Winter, Spring. Three hours lecture and quiz each week. Prerequisite, Business Organization 700. Mr. Beckman.

The nature and functions of credit. Form of credit instruments; classes of credit; the credit manager; the credit risk. Sources of credit information; mercantile agencies; credit interchange bureaus; etc. Credit department organization and management. Collection methods and policies; collection correspondence; collection agencies and attorneys. Legal safeguards; extensions; composition adjustments; adjustment bureaus; receivership; bankruptcy, credit insurance.

712. Salesmanship. Three credit hours. One Quarter. Autumn, Winter, Spring. Three lecture and discussion periods each week. Prerequisite, Business Organization 700. Mr. Maynard, Mr. Shively, Mr. Beckman, Mr. Reeder.

Knowledge of goods; prospecting; study of prospects or customers and their wants; buying motives; appeals to reason; appeals to instincts; planning a sale; attitude of buyers; sizing up a prospect; conducting a sales talk; meeting objections; closing the sale; qualities of a salesman; cultivation of personality, routine work of a salesman; survey of sales management practices as they relate to the salesman.

716. Principles of Advertising. Three credit hours. One Quarter. Autumn, Winter, Spring. Three lecture and discussion periods each week. Prerequisite, Business Organization 712. Mr. Maynard. Mr. Shively.

The work of advertising; duties and methods of advertising departments and advertising agencies; securing and holding attention; headlines; effectiveness of different kinds of copy for the body of the advertisement; illustrative work; selection of type; color; display and form; laying out the advertisement; advantages of the leading forms of advertising; choice of media; testing values; costs of advertising; advertising campaigns; legal limits and restrictions on advertising.

717. Advertising Practice. Three credit hours. Spring Quarter. Three lecture and discussion periods each week. Prerequisite, Business Organization 716. It is recommended that this course be preceded by Psychology 635. Mr. Shively.

This course offers opportunity for the further application of the principles of advertising to the advertising of selected products. The work covers study of the product, analysis of the market, selection of mediums, determination of appeals to be made and the amount of space desired, writing of copy, planning the type illustrations to be used, and laying out the advertisement.

***719. Retail Advertising.** Three credit hours. Spring Quarter. Two recitations and two laboratory hours each week. Prerequisite, Business Organization 716. Mr. Shively.

Factors to be considered in planning retail advertising; the retail advertising appropriation; schedules of advertising; retail store appeals; responsibilities and duties of advertising manager and staff; direct mail department (methods and technique); special attention to copy, type, and layout in laboratory problems.

720-721. Exporting and Importing. Three credit hours. Autumn and Spring Quarters. 720 is given in the Spring Quarter, and 721 in the Autumn. Three hours lecture and quiz each week. Preferably preceded or accompanied by Economics 610 and Business Organization 700. Mr. Starr.

Methods of conducting export and import business; foreign trade correspondence and advertising; market analysis; export commission houses and other sales agencies; handling shipments; credits and collections.

725. Field Work in Marketing. Three to six credit hours. One Quarter. Autumn, Winter, Spring. Prerequisite, Business Organization 700. Open to students in the Marketing group only. Mr. Weidler.

Before entering upon the fourth year of residence, an opportunity will be given to a limited number of students who have demonstrated their ability, to do one Quarter's work in business under the supervision of the instructional staff. The work will probably carry pay and must be a regular production position in the field of distribution. The position must have the approval of the instructor, and a report will be made by both the student and the employer.

726-727-728. Thesis in Marketing and Advertising. One to three credit hours. Autumn, Winter, Spring Quarters. Prerequisite, permission of the instructor. Mr. Weidler, Mr. Maynard, Mr. Beckman, Mr. Shively.

Individual and group research in the fields of marketing, merchandising, advertising and sales. This course is designed to give training in research and to offer an opportunity to students for investigation of the problem or problems of their future field of work.

739. Sales Administration. Three credit hours. One Quarter. Winter and Spring. Prerequisites, Business Organization 700 and 712. Mr. Maynard.

Problems in sales management; sales organization; sales planning and research;

* Not given in 1926-1927.

sales policies; sales methods; selecting salesmen; training salesmen; determination of equipment; territories and quotas; compensation of salesmen; stimulation of salesmen; supervision of salesmen.

740. Railway and Public Utility Organization and Administration. Three credit hours. Winter Quarter. Three lecture and quiz periods each week. Prerequisite, Economics 618. Mr. Power.

The development of railway and public utility organization. Government control of location and construction. Development of railroads and utilities and their functions. Inter-railway and utility relationships and their effect upon both rates and service. Legislative, judicial, and administrative control of railroads and utilities. The effect of railway and public utility control upon the management of these industries.

744. Port and Terminal Problems. Three credit hours. Winter Quarter. Three lecture and discussion periods each week. Prerequisite, Economics 618. Mr. Starr.

A study of the coordination of rail and ocean transportation; characteristics of properly coordinated port facilities; importance of ports as links in rail and ocean commerce; rail rates on exports and imports; policy of railroads concerning absorption of various terminal charges and its relation to terminal congestion; the need for unification of port facilities and services; the electrification of railroad terminal service; consideration of separation of freight rate for the line haul from the terminal charge; port organization and control and its relation to the present program of regulation by municipalities, states, and federal government.

745. Ocean and Inland Water Commerce and Transportation. Three credit hours. Autumn Quarter. Three lecture-discussion periods each week. Prerequisite, Economics 618. Mr. Starr.

A study of the development of ocean and inland water transportation; monopoly and competition; traffic and rate agreements and their effect upon commerce and industry in the United States; pools and conferences among ocean carriers; principles of ocean and inland water freight rates; effect of the policy of this country concerning freight rates on exports and imports and the influence of this policy on our foreign and domestic commerce. Consideration of exclusive contracts between ocean and rail carriers and the effect of such contracts on commerce through our ports; attention given to proposed plans of regulation of the volume of traffic through our various ports by application of freight rate differentials to the different ports; relation of distribution of commerce to ports to part congestion. Government aid and regulation of commerce and transportation.

***748. Valuation and Rate Problems of Railroad and Public Utilities.** Three credit hours. Winter Quarter. Three lecture and discussion periods each week. Prerequisite, Economics 618 or 648. Mr. Ruggles.

A study of the various methods of valuation including original cost, and different types of reproduction theories, with special reference to physical and non-physical elements, and their significance in determining reasonableness of rates, valuation for condemnation and for taxation. Study is made of typical valuation and rate cases before state public utilities commissions and before the Interstate Commerce Commission.

752-753. Traffic Management and Rate Making. Three credit hours. Winter and Spring Quarters. Prerequisite, Economics 618. Credit will

* Not given in 1926-1927.

be given for Business Organization 752 without taking 753. Mr. Starr.

The object of this course is to acquaint the student with the actual work of traffic departments of industries and carriers. A study is made of the principal routes of traffic in the United States including the recent development and significance of highway transportation; the relation of highway freight transportation to steam and electric railway transportation; the significance of hard surface roads and auto truck transportation to industrial development, commercial intercourse, organization and administration of traffic departments of industries, and to store door delivery of steam and electric railways. Special attention is given to bills of lading, routing of shipments, tracing of traffic, presentation and handling of claims, storage, demurrage, reciprocal demurrage and to switching service for shippers and for carriers. Study is made of rate cases which have come before the Interstate Commerce Commission since the Mann Elkins legislature of 1910; of the rules of the Commission concerning the compilation, filing, and publication of rates; and of the principles followed by the Commission in rate cases. Emphasis is placed on industrial traffic problems in the first quarter and railway traffic problems in the second quarter. A special report is required of each student either in industrial traffic management or in railway traffic management.

760. Life Insurance. Three credit hours. Winter Quarter. Three lecture and discussion periods each week.

Nature of life insurance; measurement of risk; net premiums; expense; reserves; surrender values and policy loans; surplus and dividends; needs of individuals; partnerships; and corporations for life insurance; kinds of policies for filling these wants; adaptation of insurance and annuities to individual cases; comparison of the policy provisions of various companies; disability, group, and fraternal insurance; kinds of companies; their organization and operation; agency, investments; state supervision.

This course is not open to students who have credit for Economics 624.

762. Fire and Marine Insurance. Three credit hours. Autumn Quarter. Three lecture and discussion periods each week.

Functions of fire insurance; relative merits of existing insurance organizations; agency; analysis and interpretation of the standard contract and the principal indorsing clauses; settlement of losses; protection of creditors; determination of rates; underwriters' associations and bureaus; fire prevention; state regulation. Character of perils of the sea; types of insurers against marine risks; agency; underwriters' associations; interpretation of the provisions of cargo, hull, and freight policies; kinds of losses and their settlement; special agreements.

764. Casualty and Miscellaneous Insurance. Three credit hours. Spring Quarter. Three lecture and discussion periods each week. Prerequisite, one of the courses in insurance.

A study of the following lines of insurance: fidelity and surety; credit; title; accident and health; automobile; burglary and robbery; engine and equipment breakage; hail; inland transportation; liability; live stock; plate glass; rain; strike, riot, and explosion; tornado and windstorm; use and occupancy; leasehold, rent, and profits; and water damage and sprinkler leakage.

766. Insurance Agency Organization and Methods. Three credit hours. Spring Quarter. Three lecture and discussion periods each week. Prerequisite, Business Organization 760, 762, or 764.

A study of the different types of agency organization; and of the different departments of a company; office organization and the division of responsibility; problems

of agency from the standpoint of the agency manager and of the solicitor; study of the business with reference to methods of obtaining clients and adapting policy forms to buyers of insurance. The course is supplemented by special lectures by persons actively engaged in different phases of the insurance business.

767-768-769. Practice Work in Insurance. One to three credit hours. All Quarters.

Students are assigned to work with a cooperating insurance organization. The work is supervised and careful reports are required of both practice and observation.

FOR GRADUATES

Prerequisite for Graduate Work: For major work in business organization a minimum of fifteen Quarter-credit hours and the consent of the instructor are required.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Research in Corporation Organization and Finance. One to six credit hours. Autumn, Winter, Spring Quarters. Mr. Hoagland, Mr. Nelson.

Individual investigations with group discussions participated in by those investigating related subjects.

805-806-807. Railway Service and Regulation. One to six credit hours. Autumn, Winter, Spring Quarters. Mr. Ruggles.

A study of railway service and its control in the United States and in European countries. Special consideration is given to control of railway service in the United States.

809-810-811. Public Utility Rate Making and Management of Public Utilities. One to six credit hours. Autumn, Winter, Spring Quarters. Mr. Ruggles.

A study of public utility rate making and the public utility management with special reference to conditions in the United States since the creation of public utility commissions.

814-815. Insurance Problems. One to six credit hours. Winter and Spring Quarters.

A problem which requires original work is assigned to each member of the class. As the information obtained from interviews, correspondence, and printed sources is obtained, it is given to the class in the form of a report. Finally, the information is presented in the form of a complete thesis.

817-818-819. Research in Marketing. One to six credit hours. Autumn, Winter, Spring Quarters. Mr. Weidler, Mr. Maynard.

Individual investigations with group discussion participated in by those investigating related subjects.

821-822-823. Research in Banking. One to six credit hours. Autumn, Winter, Spring Quarters. Mr. Dice.

The work under this head will consist of study made of special problems in the

field of banking. Each student in conference with the instructor in charge will choose some problem along his line of interest. Large emphasis will be placed on field work. It is expected that each student make a more or less prolonged study of his problem, from time to time present the material he has gathered in the form of reports, and write a paper which shall represent the work complete.

824-825-826. **Research in Advertising and Sales.** One to six credit hours. Autumn, Winter, Spring Quarters.

Individual investigations with group discussion participated in by those investigating related subjects.

831-832-833. **Graduate Seminary in Business Organization.** One to six credit hours. All instructors.

835-836-837. **Research in Industrial Management.** One to six credit hours. Mr. Fisher.

CERAMIC ENGINEERING

Office, 233 Lord Hall

PROFESSOR WATTS, ASSISTANT PROFESSOR CARRUTHERS, MR. WESTENDICK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in ceramic engineering in addition to any prerequisites stated in the description of the courses.

605. **Bodies, Glazes and Color.** Four credit hours. Winter Quarter. Four lectures each week. Prerequisite, Ceramic Engineering 615. Mr. Watts.

Ceramic bodies, glazes, and colors.

610. **Refractories and Furnaces.** Five credit hours. Spring Quarter. Five lectures each week. Mr. Watts, Mr. Carruthers.

Lectures on refractories, their physical and chemical compositions and properties, their utilization and testing. Mr. Watts.

Lectures on laboratory and industrial furnaces for high temperatures. Mr. Carruthers.

615. **Ceramic Calculations.** Five credit hours. Autumn Quarter. Five recitations each week. Mr. Westendick.

Solution of chemical and physical problems involved in compounding ceramic mixtures, including wet blending. Also instruction in development of series, containing one, two, and three variables.

620. **Physical and Chemical Measurements of Clays and Other Ceramic Materials.** Five credit hours. Winter Quarter. Two recita-

tions and nine laboratory hours each week. Prerequisites, Ceramic Engineering 615 and Chemistry 681. Mr. Westendick.

Application of physical chemical laws to ceramic materials and compounds. Laboratory practice in determination of the essential physical and chemical properties of ceramic mixtures and compounds in the plastic, dry, vitrified, and fused states.

701. Laboratory Work in Ceramics. Five credit hours. Autumn Quarter. One lecture, one quiz, and eight laboratory hours each week. Prerequisites, Ceramic Engineering 605, 615, 620. Mr. Watts.

Practice in the production of heavy clay wares, including the making of bodies, slips, engobes, and glazes. All ware is burned and tested.

702. Laboratory Work in Ceramics. Five credit hours. Winter Quarter. One lecture, one quiz, and eight laboratory hours each week. Prerequisite, Ceramic Engineering 701. Mr. Watts.

Practice in the production of fine ceramic wares including the making of bodies and glazes. All ware is burned and tested.

703. Laboratory Work in Ceramics. Five credit hours. Spring Quarter. One lecture, one quiz, and eight laboratory hours each week. Prerequisite, Ceramic Engineering 702. Mr. Watts.

Practice in the production of special ceramic wares, glazes and colors, including underglaze and overglaze colors. All ware is burned and tested.

704. Laboratory Work in Ceramics. Five credit hours. Spring Quarter. One lecture, one quiz, and eight laboratory hours each week. Prerequisites, Ceramic Engineering 605, 615, and 620. Mr. Westendick.

The theory and practice in the enameling of cast iron and steel.

705. Ceramic Designing. Five credit hours. Autumn Quarter. One lecture, one quiz, and eight laboratory hours each week. Mr. Carruthers.

Designing of clay plant structures and arrangement of machinery equipment. Practical problems in structural mechanics and in the handling of air for drying clay wares.

706. Ceramic Designing. Five credit hours. Winter Quarter. One lecture, one quiz, and eight laboratory hours each week. Prerequisite, Ceramic Engineering 705. Mr. Carruthers.

This course is a continuation of Ceramic Engineering 705. Study of drying and burning problems and the design of driers and kilns.

707. Ceramic Designing. Five credit hours. Spring Quarter. One lecture, one quiz, and eight laboratory hours each week. Prerequisite, Ceramic Engineering 706. Mr. Carruthers.

This course is a continuation of Ceramic Engineering 706. Design of power houses and complete clay plants.

FOR GRADUATES

Prerequisite for Graduate Work: The courses offered presuppose good training in the fundamentals of inorganic chemistry, including qualitative and quantitative analysis, a knowledge of the general principles of ceramic technology, such as is given in the lectures of the second and third years of the course, a knowledge of mathematics through calculus and analytical mechanics, physics to the extent of a good year's course, with laboratory and problem work, and engineering drawing to enable free attack of original plans.

For major work a candidate must hold a baccalaureate degree in Ceramic Engineering.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Research Work. Three to ten credit hours. Autumn, Winter, Spring Quarters. Library, conference, and laboratory work. Time arranged with the instructor. Prerequisite, the permission of the instructor in charge.

Research work in analytical and physical chemistry of silicates is conducted under the supervision of Mr. Watts; in mineralogy and geology of clay deposits and testing of clays and clay products, under Mr. Watts; in the engineering and designing of structures for ceramic industries under Mr. Carruthers.

805-806-807. Testing of Clays with Reference to Their Industrial Adaptability. Two credit hours. Autumn, Winter, Spring Quarters. Mr. Watts.

810-811-812. Porcelain for Electrical and Other Special Purposes. Two credit hours. Autumn, Winter, Spring Quarters. Mr. Watts.

815-816-817. Advanced Experimental Work. Two to five credit hours. Autumn, Winter, Spring Quarters. Prerequisites, Ceramic Engineering 620, 703. Mr. Watts.

This course is given to furnish opportunity for advanced studies along special lines or for investigations in the various fields of clay, cement, or glass manufacture.

CHEMICAL ENGINEERING

Office, 100 Chemistry Building

PROFESSOR WITHROW, MR. VILBRANDT, MR. BROWN, MR. ARTHUR

FOR ADVANCED UNDERGRADUATES AND GRADUATES

700. Elements of Chemical Engineering. Two credit hours. Winter Quarter. Mr. Withrow.

A thorough discussion of the fundamental principles underlying the engineering operations which constitute the body of chemical engineering as a branch of engineering. An introduction is given to the mechanical equipment which is used to carry out these engineering operations in the chemical industries. The relationship between chemical

processes and the selection of engineering equipment to carry out the engineering operations demanded by these chemical processes is emphasized. The chemistry fundamental to or utilized by an industry is referred to as the basis which determines the engineering operations necessary in utilizing the chemistry for productive manufacture. The main detailed engineering operations taken up are transportation; storage; crushing and grinding; calcination; solution; mixing and agitation; classifying; the separation of solids from liquids by sedimentation, filtration, crystallization, refrigeration, precipitation, evaporation, distillation, and electrolysis; the separation of liquids from liquids; drying; absorption; and the special engineering manipulation required in highly standardized or individualized chemical processes such as gasification; hydrogenation; sulphonation, nitration, chlorination, reduction, cracking, hydrozylation, autoclaving, and impregnation.

This course is not open to students who have credit for Chemistry 700.

701-702. Industrial Chemistry. Three credit hours. Autumn and Winter Quarters. Three lectures each week. Prerequisite, Chemistry 681-682-683. Mr. Withrow.

The fundamental lecture course in industrial chemistry, dealing with the problems of the chemical industries, and placing stress upon the economic questions involved in chemical manufacturing; materials of plant construction, as well as the engineering operations involved in chemical engineering, and the principles underlying the applications of chemistry and engineering to a selected number of chemical industries. The work of the Autumn Quarter deals especially with the inorganic industries, while that of the Winter Quarter is related to the organic industries.

This course is not open to students who have credit for Chemistry 701-702.

703. Inspection Trip to the East. No credit hours. Week of May 1, 1927, and odd-numbered years thereafter. Prerequisite, permission of the instructor. Mr. Withrow, Mr. Vilbrandt, Mr. Brown.

The trip includes Rittman, Akron, and Cleveland, Ohio; Buffalo, Niagara Falls, and Rochester, N. Y.; Pittsburgh and McKeesport, Pa. The entire expense need not exceed $65.00. A satisfactory written report upon the work of the trip and an examination are required.

704. Inspection Trip to the West. No credit hours. Week of May 1, 1926, and even-numbered years thereafter. Prerequisite, permission of the instructor. Mr. Withrow, Mr. Vilbrandt, Mr. Brown.

The trip includes Dayton, West Carrollton, Hamilton, Cincinnati, and Ivorydale, Ohio; Kensington, Ill.; Gary, Grasselli, and Whiting, Ind.; Chicago and Argo, Ill.; Detroit, Mich.; and Toledo, Ohio. The entire expense need not exceed $55.00. A satisfactory written report upon the work of the trip and an examination are required.

705. Written Reports. No credit hours. Spring Quarter. Prerequisite or concurrent, Chemical Engineering 701-702. Mr. Withrow.

A substitute course for Chemical Engineering 703 or 704, allowed only upon presentation of reasons satisfactory to the instructor in charge. The course consists of assigned reading designed to familiarize the student with all that can be found in the literature or plants regarding chemical engineering, and specified chemical processes, together with a full written report.

706. Chemical Engineering and Industrial Chemistry Laboratory. Five credit hours. Autumn Quarter. One conference and fourteen labo-

ratory hours each week. Prerequisite or concurrent, Chemical Engineering 701. Mr. Withrow, Mr. Vilbrandt, Mr. Brown, Mr. Arthur.

An introduction to industrial chemical research through assigned manufacturing problems. The specific problems are so chosen as to disclose the fundamental principles underlying the assigned industry, and practice is afforded in the preparation of written reports. Opportunity is given for study of operating efficiency of certain engineering equipment utilized in the fundamental engineering operations of chemical engineering. Weekly inspection trips are taken to plants in and around Columbus for study and report upon equipment and operation. Great emphasis is laid upon methods of attacking problems and upon organization of reports. Certain types of problems with engineering equipment, in factory research and in applied electrochemistry, are required of all students, after which opportunity is given the student to select special problems in various portions of the fields of industrial chemistry and chemical engineering such as absorption systems, filtration, petroleum and sugar technology, intermediates, wood distillation, insecticides, lime, chlorine, and plant fume questions.

This course is not open to students who have credit for Chemistry 706.

707. Engineering Chemistry. Three credit hours. Winter Quarter. One conference and eight laboratory hours each week. Prerequisite, Chemical Engineering 706. Mr. Withrow, Mr. Vilbrandt, Mr. Brown, Mr. Arthur.

This course is a continuation of Chemical Engineering 706 with additional laboratory work on technical methods of control, as applied to industrial processes.

This course is not open to students who have credit for Chemistry 707.

708. Practical Experience in Chemical Engineering Work. Six credit hours. Prerequisite, Chemical Engineering 700. Mr. Withrow.

Academic credit for this course is based on the reports of a student who has had practical experience of a chemical engineering character in a semi-responsible position covering a more advanced grade of work than that required in Chemical Engineering 501.

The student shall present a satisfactory report, the outline and basis of which, it is preferred, shall be arranged in conference prior to beginning the work. In general the report shall cover in very considerable detail, the particular industry with which the student is connected, in respect to "Market Demand and Economics," "Chemistry Involved," "Engineering Operations," "Plant Layout," "Special Equipment and Design," "Operation Methods," "Costs and Efficiencies" (in so far as this information is obtainable) "Labor Problems" and "Safety and Health Hazards," together with other pertinent matter. Flow sheets, production schedules, sketches and photographs to illustrate the report, are especially to be desired.

A student who has had twelve months' experience, or more, may present a report which, if satisfactory, will be accepted in lieu of the above requirements.

710. Applied Electrochemistry. Three credit hours. Spring Quarter. Three lectures each week. Prerequisite, Chemistry 681-682-683 or special permission. Mr. Brown.

A survey of the electrochemical industries, and a discussion of the principles underlying the application of the electric current in chemical industries.

This course is not open to students who have credit for Chemistry 710.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "900" group except by permission of the Graduate Council.

900-901-902. Advanced Industrial Chemistry and Chemical Engineering. Two to five credit hours. Autumn, Winter, Spring Quarters. One hour conference and five to fourteen laboratory hours each week. Prerequisites, acceptable courses in industrial chemistry. Mr. Withrow.

An advanced course dealing with the solution of minor problems in industrial chemistry and in chemical engineering. Special work will be planned along lines in industrial chemistry as may be desired by the individual student.

This course is not open to students who have credit for Chemistry 900-901-902.

905-906-907. Seminary in Industrial Chemistry and Chemical Engineering. Two credit hours. Autumn, Winter, Spring Quarters. Two conference hours each week. Prerequisites, satisfactory courses in industrial chemistry. Mr. Withrow.

The course consists of conferences and reports upon methods of attacking special problems in industrial chemistry and chemical engineering. The topics vary from Quarter to Quarter, keeping in touch with the constant development of chemical industry.

This course is not open to students who have credit for Chemistry 905-906-907.

950. Industrial Chemistry Research and Chemical Engineering. Five to fifteen credit hours. Autumn, Winter, Spring Quarters. Library, conference and laboratory work. Prerequisites, satisfactory courses in the chosen field of research.

In industrial chemistry, applied electrochemistry and in chemical engineering, Mr. Withrow.

CHEMISTRY

Office, 100 Chemistry Building

PROFESSORS McPHERSON, FOULK, HENDERSON, EVANS, BOORD, AND MACK, ASSISTANT PROFESSORS HOLLINGSWORTH, FRANCE, DAY AND LOOKER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in general chemistry, qualitative analysis, quantitative analysis, and organic chemistry in addition to any prerequisites stated in the description of the courses. Course 681-682-683 requires also an acceptable course in physics.

621. Advanced Quantitative Analysis. Four or five credit hours. Autumn Quarter. One conference and nine or twelve laboratory hours each week. Mr. Foulk.

An extension of the first year's work in quantitative analysis. It includes electrometric titrations, colorimetric and turbidimetric analysis, and hydrogen ion determinations.

622. General Quantitative Analysis. Three credit hours. Winter Quarter. Three recitations each week. Mr. Foulk.

The general principles used in developing methods of chemical analysis. The recitations are based upon assignments from one of the larger textbooks of quantitative analysis.

623. Gas Analysis. Four or five credit hours. Winter Quarter. One conference and nine or twelve laboratory hours each week. Mr. Hollingsworth.

An introductory course in gas analysis including some of its technical applications.

624. Advanced Qualitative Analysis. Four or five credit hours. Spring Quarter. One recitation and nine or twelve laboratory hours each week. Mr. Hollingsworth.

The general system of qualitative analysis, as published by A. A. Noyes and his associates, forms the basis of this course. It includes the more abundant of the so-called rare elements, and emphasizes such points as the detection of small quantities of substances and rough estimates of the percentages present.

625. Water Analysis. Five credit hours. Spring Quarter. Three lectures and six laboratory hours each week. Mr. Foulk.

The methods of sanitary and industrial water analysis and the interpretation of the analytical results.

627. Industrial Water Problems. Three credit hours. Winter Quarter. Three lectures or recitations each week. Prerequisites, acceptable courses in quantitative analysis. Mr. Foulk.

The chemistry of scale formation, foaming and priming in steam boilers, corrosion in hot and cold water systems, and the purification of water for industrial use.

641. Qualitative Organic Analysis. Three credit hours. Spring Quarter. One lecture and six laboratory hours each week. Mr. Boord.

A study of the systematic methods of separation, purification, and identification of organic compounds.

642. Quantitative Organic Analysis. Three credit hours. Spring Quarter. One lecture and six laboratory hours each week. Mr. Boord.

Practice in the standard methods for the quantitative analysis of organic compounds, including combustion, and the quantitative estimation of organic radicals present in various compounds.

662. Advanced General Chemistry. Three credit hours. Winter Quarter. Three lectures or recitations each week. Mr. France.

An advanced course in general chemistry, stressing the more difficult topics touched upon in the elementary courses.

663. The Rare Elements. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Henderson.

A course of lectures on the chemistry of the less familiar elements, emphasizing their relations to the well-known elements, as well as their technical applications.

672. Inorganic Preparations. Three credit hours. Spring Quarter. Nine laboratory hours each week. Mr. France or Mr. Mack, and assistants.

The methods employed in the preparation of purely inorganic compounds; the chief classes of such compounds; and the laboratory preparation of a number of examples sufficient to develop reasonable technique in applying the methods and to illustrate the classes.

681-682-683. Physical Chemistry. Three credit hours. Autumn, Winter, Spring Quarters. Three lectures each week. Mr. Mack or Mr. France.

This is the fundamental course in physical chemistry, extending through three Quarters. It is arranged for all students specializing in chemistry.

NOTE: Beginning in 1926-1927, a course in calculus, equivalent to Mathematics 441-442-443, will be a prerequisite for physical chemistry.

691-692-693. Physical Chemistry: Laboratory. Two credit hours. Autumn, Winter, Spring Quarters. Six laboratory hours each week. Prerequisite or concurrent, Chemistry 681-682-683. Mr. Mack or Mr. France, and assistants.

These three courses constitute the elementary course in physicochemical measurements. Any one may be taken in any Quarter.

695. Colloid Chemistry. Three credit hours. Winter Quarter. Three lectures or recitations each week. Prerequisites, Chemistry 681-682-683. Mr. France.

This is a fundamental course in colloid chemistry.

696. Theoretical Electrochemistry. Three credit hours. Autumn Quarter. Three lectures or recitations each week. Prerequisites, Chemistry 681-682-683. Mr. France.

This is a fundamental course in theoretical electrochemistry.

699. Minor Problems in Chemistry. Three to fifteen credit hours. Any Quarter. Conference, library, and laboratory work. Prerequisites, satisfactory courses in the field of the problem undertaken. A student may repeat this course and may spend all or any part of his time on it during a Quarter.

This course is designed to permit any properly qualified person to avail himself of the library and laboratory facilities of the department for carrying out a minor investigation or for adding to his knowledge and technique in some chemical subject.

A student may exercise entire freedom in his choice of instructor to conduct his work in this course, but as a rule, topics in organic chemistry will be under the direction of Mr. McPherson, Mr. Evans, Mr. Boord, and Mr. Looker; in inorganic chemistry, under Mr. Henderson, Mr. France, and Mr. Day; in physical chemistry, under Mr. Mack, Mr. France, and Mr. Day; and in analytical chemistry, under Mr. Foulk and Mr. Hollingsworth.

782. Chemical Bibliography. One credit hour. Winter Quarter. One conference each week. Mr. McPherson.

Designed to train the advanced student in the use of the chemical library, and to instruct him in the character of various chemical journals, dictionaries, reference books, and other sources of information pertaining to chemical subjects.

783. Chemical Biography. One credit hour. Spring Quarter. One lecture each week. Prerequisite, Chemistry 681-682-683. Mr. Henderson.

Designed to familiarize the advanced undergraduate student with the leading personages in chemistry, particularly those of recent and contemporary times, as well as with the available sources of information relating to such personages.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 710.

FOR GRADUATES

Prerequisite for Graduate Work: As a prerequisite for admission to graduate work in chemistry all students must have a thorough preparation in general inorganic chemistry, qualitative and quantitative analysis, and an introductory course in organic chemistry. In addition to the above, candidates for the degree of Doctor of Philosophy must have completed acceptable courses in physics and mathematics.

For all advanced courses in chemistry, particularly seminary courses, a reading knowledge of German and French is highly desirable if not necessary. Students deficient in this respect should consult at once with their advisers.

All candidates for the Master's degree taking major work in chemistry must complete the following general courses unless already credited with the same: Organic Chemistry (including laboratory), extending through the year; Inorganic Preparations 672, extending through one Quarter; Physical Chemistry 681-682-683; Chemical Bibliography 782; and Chemical Biography 783. Additional courses must also be taken, the selection being subject to the approval of the department.

All candidates for the degree of Doctor of Philosophy taking major work in chemistry must complete the following courses in addition to those specified for the Master's degree: Historical Chemistry 930; Physical Chemistry 691-692-693 and 861; Quantitative Analysis 622; Organic Chemistry 641. These are simply the fundamental courses required of all candidates. Additional courses in the particular field in which the candidate is specializing, including the research work, must also be taken, the selection being subject to the approval of the department.

An undergraduate student shall not be permitted to take any course in the "800" or "900" group except by permission of the Graduate Council.

822. Seminary in Analytical Chemistry. Three credit hours. Autumn Quarter. Three conferences each week. Prerequisites, acceptable courses in analytical, organic, and physical chemistry. Mr. Foulk.

The course consists of conferences and reports upon some chosen topic in the field of analytical chemistry. Topic for 1926-1927: Standard Substances Used in Chemical Measurements.

841. Advanced Organic Chemistry. Three credit hours. Autumn Quarter. Three lectures each week. Prerequisites, acceptable courses in organic chemistry including laboratory work. Mr. Boord.

An advanced course in the fundamental principles of organic chemistry covering the chain hydrocarbons and their derivatives.

842. **Advanced Organic Chemistry.** Three credit hours. Winter Quarter. Three lectures each week. Prerequisites, acceptable courses in organic chemistry including laboratory work. Mr. Boord.

This course is a continuation of Chemistry 841, covering the carbocyclic, including aromatic, hydroaromatic, and terpene derivatives, and heterocyclic compounds.

844. **Advanced Organic Preparations: Laboratory.** Three credit hours. Autumn Quarter. Nine hours of library, conference, and laboratory work each week. Prerequisite or concurrent, Chemistry 841. Mr. Boord.

An advanced course in the synthesis of aliphatic organic compounds that involve difficulties, special stress being placed upon yield and purity of products.

845. **Advanced Organic Preparations: Laboratory.** Three credit hours. Winter Quarter. Nine hours of library, conference and laboratory work each week. Prerequisite or concurrent, Chemistry 842. Mr. Boord.

This course is a continuation of Chemistry 844. The work consists in the synthesis of aromatic compounds. Chemistry 844 and 845 lead directly to minor research problems in organic chemistry.

850. **Seminary in Organic Chemistry.** Three credit hours. Autumn Quarter. Three conference hours each week. Prerequisites, Chemistry 841, 842. Mr. Boord.

The course consists of conferences and reports upon some chosen topic in the field of organic chemistry. Topic for 1926-1927: A Survey of our Knowledge of Absorption Spectra of Organic Compounds.

851. **Seminary in Organic Chemistry.** Three credit hours. Winter Quarter. Three conference hours each week. Prerequisites, Chemistry 841, 842. Mr. Evans.

The course consists of conferences and reports upon some chosen topic in the field of organic chemistry. Topic for 1926-1927: Selected Chapters in Organic Nitrogen Derivatives (First group).

852. **Seminary in Organic Chemistry.** Three credit hours. Spring Quarter. Three conference hours each week. Prerequisites, Chemistry 841, 842. Mr. McPherson.

The course consists of conferences and reports upon some chosen topic in the field of organic chemistry. Topic for 1926-1927: Stereo-isomerism.

853. **Seminary in Organic Chemistry.** Two credit hours. Winter Quarter. Two conference hours each week. Prerequisites, Chemistry 841 and 842. Mr. Looker.

This course consists of conferences and reports upon some chosen topic in the field of organic chemistry. Topic for 1926-1927: Photo Chemistry.

861-862-863. Physical Chemistry: Laboratory. Three credit hours. Autumn, Winter, Spring Quarters. Nine laboratory hours each week. Prerequisites, acceptable courses in physical chemistry including elementary laboratory work. Mr. Mack or Mr. France, and assistants.

This is the advanced course in physicochemical experimental work designed to illustrate the more important principles of physical chemistry, to develop skill in this type of laboratory work and to form a basis for research work in this branch of chemistry. Any one may be taken in any Quarter.

865. Atomic Structure. Two credit hours. Spring Quarter. Two lectures or conferences each week. Prerequisites, acceptable courses in physical chemistry. Mr. Henderson.

This course will be devoted to a study of the modern theories involving the structure of the atom.

866. Seminary in Inorganic Chemistry. Two credit hours. Winter Quarter. Two conferences each week. Prerequisites, acceptable courses in physical chemistry. Mr. Day.

Topic for 1926-1927: Catalysis.

891. Seminary in Physical Chemistry. Three credit hours. Autumn Quarter. Three conferences each week. Prerequisites, acceptable courses in physical chemistry. Mr. France.

Topic for 1926-1927: Ultramicroscopic Investigations.

892. Seminary in Physical Chemistry. Three credit hours. Winter Quarter. Three conferences each week. Prerequisites, acceptable courses in physical chemistry. Mr. Mack.

Topic for 1926-1927: Thermodynamics for the Chemist.

930. Historical Chemistry. Three credit hours. Winter Quarter. Three lectures each week. Prerequisites, acceptable courses in organic and physical chemistry. Mr. Henderson.

A general course in the history of chemistry with special reference to the development of the theories of the science.

950. Chemical Research. Autumn, Winter, Spring Quarters. Library, conference and laboratory work. Prerequisites, acceptable courses in the chosen field of research. The student may spend a part or all of his time on research work.

Research work in organic chemistry is conducted under the supervision of Mr. McPherson, Mr. Evans, Mr. Boord, and Mr. Looker; in inorganic chemistry under Mr. Henderson, Mr. France, and Mr. Day; in physical chemistry under Mr. Mack, Mr. France, and Mr. Day; in analytical chemistry under Mr. Foulk and Mr. Hollingsworth.

NOTE: Attention is called to the fact that courses in physiological chemistry are listed under the Department of Physiological Chemistry and Pharmacology elsewhere in this Bulletin.

NOTE: For Industrial Chemistry, Applied Electrochemistry, and Chemical Engineering Courses see the Department of Chemical Engineering.

CIVIL ENGINEERING

Office, 108 Brown Hall

PROFESSORS SHERMAN, ENO, CODDINGTON, AND PRIOR, MR. BYRNS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Prerequisites are waived for graduate students majoring in the curriculum in Public Health. For prerequisites for 608 and 609 see descriptions of the courses.

602. Sanitary Engineering. Five credit hours. Autumn Quarter. Five recitations each week. Open to students who are majoring in the curriculum in Public Health. Mr. Eno, Mr. Prior.

Lectures and recitations upon sewerage systems; sewage; and sewage treatment.

608. Precise Surveying. Three credit hours. Autumn Quarter. One recitation and two laboratory periods each week. Prerequisites, calculus, railroad surveying, and summer surveying camp. Mr. Coddington, Mr. Byrns.

Primary traverse, base line measurements, field triangulation, precise leveling.

609. Adjustment of Observations. Three credit hours. Winter Quarter. Three two-hour laboratory periods each week. Prerequisite, Civil Engineering 608. Mr. Coddington, Mr. Byrns.

Theory of adjustment of observations, using work of preceding term; precise maps.

703. Water Supply Engineering. Four credit hours. Winter Quarter. Five recitations each week. Open to students who are majoring in the curriculum in Public Health. Mr. Eno, Mr. Prior.

Construction and operation of public water supplies.

CLASSICAL LANGUAGES AND LITERATURE

PROFESSORS OGLE, HODGMAN, ELDEN, AND BOLLING, MR. SMITH

GREEK

Office, 102 Hayes Hall

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Courses 601 and 610 require a course in elementary Greek. There are no prerequisites for 650, 651, 652, and 701 other than the permission of the instructor. For 650, 651, and 652 a knowledge of Greek is not required.

601. Reading and Lectures. Three to five credit hours. One Quarter. Winter and Spring. Three to five meetings each week. Mr. Bolling, Mr. Smith.

Study of the language, style, and works of some author or group of authors, chosen to meet the particular needs of the class. The course may consequently be repeated.

610. Private Reading and Minor Problems. Two to five credit hours. Autumn, Winter, Spring Quarters. Mr. Bolling, Mr. Smith.

Passages for private reading and topics for investigation will be suggested to meet the needs of individual students.

650. Greek Art. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Bolling.

Description and discussion of the monuments of the pre-historic period—the civilization of Crete and Mycene.

***651. Greek Art.** Three credit hours. Winter Quarter. Three lectures each week. Mr. Bolling.

The history of Greek vase painting.

652. Greek Art. Three credit hours. Spring Quarter. Three lectures each week. Mr. Bolling.

The history of Greek sculpture.

701. Principles of the Historical Study of Language. Three credit hours. Spring Quarter. Three lectures each week. Mr. Bolling.

The elements of linguistic science together with an outline of the Indo-European family of languages.

720. Historical Greek and Latin Grammar. Three credit hours. Autumn Quarter. Prerequisite, ten credit hours of advanced Greek and Latin. Mr. Bolling.

NOTE: This course is the same as Latin 720.

LATIN

Office, 206 Hayes Hall

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Acceptable courses in Latin in addition to any prerequisites stated in the description of the courses, except for 606, 607, and 608 which do not require a Latin prerequisite. As a rule, six Quarters of college Latin fulfills the Latin prerequisite.

601. Catullus, Pliny, Tacitus. Three credit hours. Autumn Quarter. Three recitations each week. Mr. Elden.

Selections from Catullus, Pliny's Letters, or Tacitus.

* Not given in 1926-1927.

*602. Latin Satire. Three credit hours. One Quarter. Three recitations each week. Mr. Elden.

Selections from the Satires of Horace or Juvenal.

603. Advanced Reading. Three credit hours. Spring Quarter. Three recitations each week. Mr. Hodgman.

The authors read in this course will be chiefly of the Silver Latin period and will vary from year to year.

604. Advanced Reading. Three credit hours. Winter Quarter. Three recitations each week. Prerequisite, Latin 601. Mr. Elden.

Selections from Lucretius, Vergil, or Seneca.

605. Legal Latin. Three credit hours. Spring Quarter. Three recitations each week. Prerequisite, Latin 601 or sufficient Latin to qualify a student for the course. Mr. Smith.

Selections from writers on the Roman Law.

606. Comparative Literature. Three credit hours. Spring Quarter. Three lectures each week. Mr. Elden.

This consists of lectures on Latin literature and its influence upon the literatures of France, Germany, and England. No knowledge of Latin is required, and the course is open to students of both ancient and modern literatures.

607. Roman Private Life. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Elden.

Lectures, illustrated with lantern slides on the daily life and customs of the Romans, their business and family relations, their amusements, dress, homes, and household furniture. A knowledge of Latin is not required for this course, and it is open to all students who are interested in the subject.

608. Roman Art and Archaeology. Three credit hours. Winter Quarter. Three lectures each week. Mr. Elden.

Lectures, illustrated with lantern slides on the daily life and customs of the ancient Roman world, with special reference to the city of Rome and its topography; also the architecture and decorative arts of the Romans, temples, palaces, private and public buildings and their construction. A knowledge of Latin is not required for this course.

609. Historical Latin Grammar: Inflections. Three credit hours. Winter Quarter. Three lectures each week. Prerequisite, Latin 603. Mr. Hodgman.

Sounds and inflections, and other topics essential to the understanding of the principles which govern the development of the Latin language. Latin 609 is deemed essential for those who make Latin a major or minor subject of study in graduate work, and is recommended for advanced undergraduate study.

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* Not given in 1926-1927.

610. Roman Religion. Three credit hours. Winter Quarter. Three lectures each week. Mr. Hodgman.

Lectures on the development of Roman religion, with readings from the Fasti of Ovid. This course is valuable as supplementing the courses on the life and literature of the Romans.

611. Roman Public Life. Three credit hours. Spring Quarter. Three lectures each week. Mr. Smith.

A brief study of the development of Roman governmental institutions, with special attention to their functions and character during the late republic and early empire.

612. Latin Prose Composition: First Course. Three credit hours. Winter Quarter. Three recitations each week. Mr. Hodgman.

Exercises and lectures on Latin idiom and style.

613. Latin Prose Composition: Second Course. Three credit hours. Spring Quarter. Three recitations each week. Prerequisite, Latin 612. Mr. Hodgman.

This course is a continuation of Latin 612.

***614. Latin Prose Composition: Advanced Course.** Three credit hours. One Quarter. Three recitations each week. Prerequisite, Latin 613. Mr. Hodgman.

A study of the more difficult points of Latin idiom and style.

615. Proseminary, I. Three credit hours. Winter Quarter. Three lectures each week. Mr. Elden.

Lectures on topics suggested by the study of Caesar and Cicero. Roman writing and Roman writing materials; story of the manuscripts; oratory and the orations; Letters of Cicero. Latin 615 is designed especially for students preparing to teach Latin.

616. Proseminary, II. Three credit hours. Spring Quarter. Three lectures each week. Mr. Elden.

Lectures on the life and works of Vergil, and his influence on modern literature. Latin 616 is designed especially for students preparing to teach Latin.

***618. Elements of Epigraphy.** Three credit hours. Winter Quarter. Three recitations each week. Mr. Smith.

Egbert's Introduction to the Study of Latin Inscriptions.

***619. Historical Latin Grammar: Syntax.** Three credit hours. One Quarter. Mr. Elden.

Lectures on the origin and development of Latin syntax.

620. Roman Elegy. Three credit hours. Autumn Quarter. Prerequisites, Latin 601, 602, and 603, or their equivalent. Mr. Ogle.

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* Not given in 1926-1927.

*621. **Roman Tragedy.** Three credit hours. Autumn Quarter. Prerequisites, Latin 601, 602, 603, or their equivalent. Mr. Ogle.

*622. **Roman Epic.** Three credit hours. Winter Quarter. Prerequisites, Latin 601, 602, 603, or their equivalent. Mr. Elden.

*623. **Advanced Reading Course in the Post-Augustan Epic.** Three credit hours. Spring Quarter. Prerequisite, either Latin 601, 602, 603, or the equivalent. Mr. Elden.

624. **Advanced Reading Course in Tacitus.** Three credit hours. Spring Quarter. Prerequisite, either Latin 601, 602, 603, or the equivalent. Mr. Elden or Mr. Ogle.

*625. **Advanced Prose Composition.** Three credit hours. Autumn Quarter. Prerequisites, Latin 612 and 613, or their equivalent. Mr. Ogle.

626. **Paleography.** Three credit hours. Autumn Quarter. Prerequisite, six Quarters of college Latin. Mr. Elden.

Study of the different styles of writing. Textual criticism based largely on Latin manuscripts.

627. **Vulgar Latin.** Three credit hours. Winter Quarter. Prerequisite, six Quarters of college Latin, or French 801, or the consent of the instructor. Mr. Ogle.

The study of texts and inscriptions illustrating the development of the popular speech.

†629. **History of Literary Tradition.** Three credit hours. Prerequisite, junior standing. Mr. Ogle.

Lectures and discussions dealing with the genesis and development of literary forms and motifs and their tradition down to the rise of modern literatures. The course will be so conducted that students of literature generally will be welcome.

720. **Historical Greek and Latin Grammar.** Three credit hours. Autumn Quarter. Prerequisite, ten credit hours of advanced Greek and Latin. Mr. Bolling.

NOTE: This course is the same as Greek 720.

NOTE: TEACHING COURSES. For the Teaching Courses in this department see the Department of Principles of Education, Courses 730 and 731. Course 731 may be counted as part of a major or minor in Latin.

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* Not given in 1926-1927.

† Not given during the academic year, 1926-1927.

FOR GRADUATES

Prerequisites for Graduate Work: For admission to graduate courses the student must have had at least two years of work in undergraduate courses. No student will be considered as a candidate for the Master's degree unless his program includes at least two courses exclusively for graduates.

Graduate courses will be offered in the Classical Languages and Literature, Life, and Archaeology.

Candidates for advanced degrees will be required to have:

(a) Some knowledge of language as such and of the place held in the history of linguistic development by the Classical Languages. To attain this end, all candidates must have at least one course in General Linguistics (Greek 701.)

(b) A knowledge of Classical Literature in its broad outlines.

(c) An understanding, in a general way, of the principles of textual criticism, and as a means to this end, some knowledge of Paleography.

Candidates for the Doctorate will be required to attain such mastery of their major language as will enable them to express themselves in it and to interpret any document in that language set before them. Similar but less difficult tests, will be applied to candidates for the Master's degree; the passages set before them for interpretation will be selected from some particular field in which they have already worked.

Candidates for the Doctorate who make one of the Classical Languages their major, must take in the other language one course, at least, from the intermediate group (600) except that Greek 650, 651, 652 and Latin 606, 607, 608 cannot be used to satisfy this requirement.

For the year 1926-1927, graduate students majoring in Latin should include in their work the following courses. Autumn Quarter: Latin 804, Seminary in the Latin Lyric; either Historical Greek and Latin Grammar (Greek 620) or Historical Latin Grammar (Latin 609). Winter Quarter: Latin 805, Seminary in the Latin Lyric, continued; Paleography (Latin 626), Prose Composition (Latin 612). Spring Quarter: Latin 806, Seminary in the Latin Satire; Prose Composition (Latin 613); General Linguistics (Greek 701).

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

***801. Seminary in the Latin Epic.** Three credit hours. Autumn Quarter. Mr. Ogle.

Research problems based upon the fragments of the early Epic. Lectures on the Greek background of the Latin Epic. The Latin Epyllion.

***802. Seminary in the Latin Epic (Continued).** Three credit hours. Winter Quarter. Mr. Ogle.

The Aeneid of Vergil will form the center of study and discussion.

***803. Seminary in the Post-Augustan Epic.** Three credit hours. Spring Quarter. Mr. Ogle.

Study and discussion of the Pharsalia of Lucan and the Argonautae of Valerius Flaccus. Lectures on the later traditions of the Epic.

804. Seminary in the Latin Lyric. Three credit hours. Autumn Quarter. Mr. Ogle.

Research problems based upon the Greek background of the Latin lyric and upon the poetry of Catullus and Horace.

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* Not given in 1926-1927.

805. Seminary in the Latin Lyric (Continued). Three credit hours. Winter Quarter. Mr. Ogle.

Lyric poetry in the later Empire and Medieval period.

806. Seminary in the Latin Satire. Three credit hours. Spring Quarter. Mr. Elden.

The works of Horace and Juvenal will form the center of study and discussion.

***807. Seminary in Latin Historiography.** Three credit hours. Autumn Quarter and Winter Quarter. To be given in 1927-1928. Mr. Ogle.

Study and discussion will be based upon the works of Livy and Tacitus.

***808. Seminary in the Latin Drama.** Three credit hours. Autumn and Winter Quarter. To be given in 1929-1930. Mr. Ogle.

The plays of Plautus and Terence will form the center of study and discussion, but part of the course will deal with the tragedies of Seneca and with their importance in the history of dramatic literature.

***809. Seminary in the Latin Philosophical Writers.** Three credit hours. Spring Quarter. To be given in 1927-1928. Mr. Elden.

The works of Lucretius, Cicero, and Seneca will form the center of study and discussion.

***810. Seminary in Classical Archaeology.** Three credit hours. Spring Quarter. To be given in 1929-1930. Mr. Elden.

The work of the course will center around the study of the archaeological remains of classical antiquity.

COMPARATIVE LITERATURE AND LANGUAGE

Courses formerly offered under the above heading will be found under the Departments of Classical Languages and Literature, and German.

DAIRYING

Office, 111 Townshend Hall

PROFESSORS ERF AND STOLTZ

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in dairying and the consent of the instructor. Course 602 requires also a fundamental course in animal husbandry.

602. Dairy Inspection Trip. Three credit hours. Spring Quarter. Mr. Erf.

This course consists of a two-weeks' inspection trip to the best dairies of the State. The methods of feeding, lines of breeding, herd management, dairy barn construction and planning, and manner of disposing of the product as found on these farms will be dis-

* Not given in 1926-1927.

cussed by the instructor. The trip will be made in machines and camping equipment will be carried. A complete report of the trip must be made. A deposit of $50 to cover the expense of the trip is required.

603. Dairy Herd Management. Three or five credit hours. One Quarter. Autumn, Winter, Spring. May be scheduled only by men doing cow testing association work. Mr. Erf.

The work of the course includes visiting not less than twenty herds for at least eight consecutive months. During these visits the milk of each cow is weighed and tested for fat and total solids, feeds are weighed and costs calculated, economical feeds selected, labor costs calculated and other items of expense determined, in order to ascertain whether each cow is kept at a profit or loss. Suggestions for methods of increasing profits and improving sanitary conditions must be incorporated in a monthly report.

604. Special Problems in Dairy Manufacturing Practice. Three to fifteen credit hours, given in units of three or five hours for one or more Quarters. Autumn, Winter, Spring Quarters. One hour conference each week. Mr. Stoltz.

This course is designed for students majoring in dairy manufacturing and consists in working out special problems along the lines in which they are specializing.

FOR GRADUATES

Prerequisite for Graduate Work: Major work in this department should embrace as general prerequisites, the courses pertaining to the fundamental principles of dairying —namely, the care of dairy cows; formation of profitable herds; equipment of dairy houses, barns, milk plants, and refrigerating plants; the testing of milk, cream, butter, and cheese; the care of milk and cream; butter making, cheese making, and ice cream making.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Advanced Dairying. Five to ten credit hours. Autumn, Winter, Spring Quarters. One hour conference each week. Prerequisite, at least twenty hours of work in the department and the consent of the instructor. Mr. Erf, Mr. Stoltz.

Special work will be arranged for students desiring to take up any particular phase of dairying. Any apparatus on hand will be furnished and room will be arranged for students desiring to take up any line, such as farm dairying, the feeding and breeding of dairy cows in relation to milk production, the study of milk in its various phases, butter making, cheese making, ice cream making, and milk condensing.

DRAWING

(See Engineering Drawing)

ECONOMICS

Office, 116 Commerce Building

PROFESSORS HAMMOND, HAYES, WOLFE, WALRADT, RUGGLES, HOAGLAND, MARK, DICE, AND HELD, ASSISTANT PROFESSOR BUCHANAN, MR. CROXTON, MR. SMART, MISS STITT, MR. BOWERS, MR. STARR

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in economics in addition to any prerequisites stated in the description of the courses. For 643 and 644 a fundamental course in sociology may be offered in place of economics.

601-602-603. Principles and Problems of Economics. Three credit hours. Autumn, Winter, Spring Quarters. Open to graduate students who consider it advisable to take the course. Mr. Wolfe.

A general course covering the entire field of economics intended for those students who plan to do only one year's work in economics or who have not had time or opportunity to do work in this field prior to their fourth year. The scope of the work is the same as in Economics 401-402, but the lectures, readings, and recitations will be suited to the needs of maturer students.

This course is not open to students who have credit for Economics 401-402.

607-608. Financial History of the United States. Three credit hours. Autumn and Winter Quarters. Mr. Walradt.

A study of the fiscal and monetary history of the country from colonial times to the present, with special reference to federal taxation, loans, and financial administration, currency, legislation, and the development of banking institutions.

610. Money and Banking. Five credit hours. One Quarter. Autumn, Winter, Spring. Five recitations each week. Mr. Buchanan, Mr. Dice, instructors, and assistants.

This course is a general survey of the field of money and banking. It is intended as an introductory study to the more technical courses in banking and finance and also to give a comprehensive view of the field of money and banking for those not primarily interested in the subjects.

Topics taken up are: coinage; the monetary systems of the United States and foreign countries; the gold exchange standard; credit; price levels; the development of banking; the commercial bank; the savings bank; the trust company; the National Banking system; the Federal Reserve system; the interrelations of our financial institutions; and the relation of the financial structure to the business and industrial system.

611. Advanced Money. Two credit hours. Autumn Quarter. Two discussion periods each week. Preferably preceded by Economics 610. Mr. Dice.

This course is a study of the gold standard; the gold exchange standard; the role of money in the economic organization; an analysis and criticism of the leading types of monetary theory; and the methods of stabilizing the price level.

612. Advanced Banking. Three credit hours. Winter Quarter. Three discussion periods each week. Prerequisite, Economics 610 or 653. Mr. Dice.

The integration of the financial institutions in our economic organization; the

theories underlying bank deposits; the theories of the elasticity of bank currency; the discount policy and the interest rate of the different central banks; the effectiveness of the different methods of regulating credit in stabilizing the price level and business activities.

616. Corporation Economics. Five credit hours. Autumn Quarter. Two lectures and three quiz periods each week. Mr. Hoagland and assistant.

This course is designed especially to meet the needs of students outside of the College of Commerce and Journalism who desire an introduction to the forms of business organization and to the financial problems of corporations. Attention will be given also to public regulation and control of corporations.

This course is not open to students who have credit for or who are taking Business Organization 650.

617. Trusts and Monopolies. Three credit hours. Autumn Quarter. Three recitations each week. Prerequisite, Economics 616 or Business Organization 640 or 650. Mr. Hoagland.

Business combinations with monopolistic tendencies; case study, historical and analytical, of typical trusts; their influence upon production, prices, profits, wages, and public welfare; early legislation against trusts; leading cases under Sherman law; dissolution proceedings and results; development of judicial interpretation of this law; foreign experience in legislation; success of early trusts; recent tendencies in legislation and in business combinations.

618. Transportation Economics. Five credit hours. One Quarter. Autumn, Winter, Spring. Five lecture and quiz periods each week. Mr. Ruggles, Mr. Starr, Mr. Power, Mr. Dewey.

The development of the means of transportation including canals, highways, and railways. Railway growth and consolidation of railways, rate theories and practice. Analysis of state and federal legislation affecting transportation. Administrative control of carriers. Government ownership of railroads.

622. Economic Statistics. Three credit hours. One Quarter. Autumn, Winter, Spring. Two lectures and one two-hour laboratory period each week. Mr. Croxton and assistant.

A general course in statistical methods dealing with the collection, presentation, and analysis of statistical data. The course will include consideration of schedules, table forms, ratios, and percentages, graphic charts, averages, and an introductory discussion of index numbers. A field problem illustrating the methods of a primary statistical study will be developed by the class.

624. Principles of Insurance. Three credit hours. Autumn Quarter. Three lecture and discussion periods each week. Mr. Bowers.

Risk; uses of insurance; kinds of insuring organizations; agency organization; underwriters' associations. Life insurance: kinds of policies and their uses; premiums; expenses; reserves; surrender values and loans; surplus and dividends; policy clauses; special forms of life insurance. Accident and health insurance. Fire insurance: insurable interest; protection of creditors; provisions of the standard policy and the principal standard indorsements; rate-making; reserves; settlement of losses. Marine, automobile, title and credit insurance; corporate bonding. State supervision.

This course is not open to students who have credit for Business Organization 760.

625-626. Economic Cycles and Forecasting. Two credit hours. Winter and Spring Quarters. Prerequisite, Economics 622. Mr. Croxton.

A quantitative approach to the general problem of economic cycles; the statistical methods used in analyzing economic data, with particular emphasis on forecasting. A consideration of existing "barometers" will be included. This course might well follow Economics 655.

631. Public Finance. Three credit hours. One Quarter. Autumn and Spring. Mr. Walradt.

A study of the problems connected with the debts, expenditures, revenues, and fiscal administration of national, state, and municipal governments.

632. Public Finance. Three credit hours. One Quarter. Autumn and Winter. Prerequisite, Economics 631. Mr. Walradt.

This course is a continuation of Economics 631.

633. Public Finance. Three credit hours. One Quarter. Winter and Spring. Prerequisite, Economics 632. Mr. Walradt.

This course is a continuation of Economics 632.

637. Industrial Relations. Three credit hours. Autumn Quarter. Mr. Hammond, Mr. Bowers, Miss Stitt.

The labor movement. Trade unions and employers' associations; their origin, growth, policies, and methods. Industrial disputes and modes of settling them: mediation, conciliation, and arbitration. Government intervention and its success at home and abroad. The recent movement to secure for labor a participation in the management of industry and to increase the interest of labor in the work of production.

638. Labor Legislation. Three credit hours. Winter Quarter. Mr. Hammond, Mr. Bowers, Miss Stitt.

Efforts on the part of government to improve the condition of the laboring class and to increase the bargaining power of labor. The theory of the legal regulation of labor; legislation and court decisions. Child labor and its legal prohibition or restriction. The legal regulation of the employment of women in industry. The problem of low-paid labor and the legal minimum wage. The working day and the legal regulation of hours of labor. Efforts to secure by law safe and sanitary conditions for workers in factories, tenements, mines, and in transportation. The administration of labor laws.

639. Social Insurance. Three credit hours. Spring Quarter. Prerequisite, Economics 638 or 624. Mr. Hammond, Mr. Bowers, Miss Stitt.

Recent efforts at home and abroad to guarantee to the worker financial security against the hazards of industry. Accident insurance; employers' liability and workmen's compensation. Industrial health hazards and health insurance. Old age and invalidity insurance or pensions. The problem of unemployment and its prevention. Employment agencies, private and public. The regularization of employment; unemployment insurance.

643. Women in Industry. Four credit hours. Winter Quarter. Four recitations each week. Miss Stitt.

A study of the economic position of women. Social, industrial, and legislative problems created by their entrance into the field of industry. A survey of the occupations open to trained women.

644. The Household. Three credit hours. Autumn Quarter. Three recitations each week. It is suggested that the one-hour course in Dietaries offered by the Home Economics Department be taken with this course. Miss Mark.

The family as an economic institution. Organization of the household with reference to the functions of the various members. The standard of living, family budgets, retail buying.

648. Economics of Public Service Industries. Five credit hours. Autumn Quarter. Three lecture and quiz periods each week. Mr. Power.

A study of the following utilities: water; sewage; gas; electric light and power; central heating; refrigeration; telephone; telegraph; pneumatic tube; surface, elevated, and subway railways; auto bus; and interurban transportation. Attention is given to the method of granting franchises; essential features of franchises for the various utilities; inter-utility relationships with special reference to mergers and consolidations and their effect upon service; local, state, and interstate utility legislation; legislative, judicial, and administrative control; services to cities, states, and to private consumers with special reference to peak load problems and discrimination in service; maximum and minimum rates and the relationship of rates to capitalization and taxation of utilities. Public ownership in Europe and the United States.

651. International Commercial Policies. Three credit hours. Spring Quarter. Mr. Held.

The theory of international trade; historic policies; mercantilism; free trade and protection. A study of the tariff policy of the United States with a comparative study of the policies of other countries. International trade as affected by the World War.

655. Prices and the Economic Cycle. Two credit hours. Spring Quarter. Preferably preceded or accompanied by Economics 610 or 611. Mr. Wolfe.

The price system. The purchasing power of money. Price levels and their measurement. The economic cycle. The problem of stabilization of prices.

656. Wages and Profits. Three credit hours. Autumn Quarter. Mr. Hayes.

The national economic income; its size and division among the different groups of income receivers. The principles governing this division. Proposals to alter the divisions of income by taxation and other methods.

657. Socialism. Three credit hours. Winter Quarter. Mr. Hayes.

A critique of the present economic system and of the leading plans proposed as substitutes for it, including state socialism, syndicalism, and guild socialism, with a view to determining their relative merits and defects. Special attention is given to the revolutionary movements abroad.

658-659. Economic Problems of Population. Two credit hours. Autumn and Winter Quarters. Mr. Wolfe.

A critical survey of the population problem in its broader economic aspects. Population theories. Factors determining the growth of population. Population in relation to productive capacity, standards of living, distribution of income, commercial rivalry, and war. Population policies historically and critically considered.

661-662-663. Economic History of the United States. Three credit hours. Autumn, Winter, Spring Quarters. Mr. Hammond.

The development of agriculture, trade, transportation, and manufactures from the comparatively simple system of colonial days to the complex economic organization of the present. The course endeavors to point out the interrelation which exists between this development and such problems as the tariff, merchant marine, commercial crises, labor, currency, and banking conditions.

FOR GRADUATES

Prerequisite for Graduate Work: A minimum of fifteen Quarter-credit hours and the consent of the instructor.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. History of Economic Thought. Three credit hours. Autumn, Winter, Spring Quarters. Mr. Hammond.

An account of the development of economic ideas and principles in the Western World with the purpose of showing how they were the outgrowth of the economic and political conditions of the times in which they originated and the extent to which they have found acceptance by present-day economists. The works of the leading writers in each period are read and discussed in class.

810-811. Principles of Economics for College Teachers. Two credit hours. Autumn and Winter Quarters. Mr. Hayes.

An advanced study of the principles of economics for graduate assistants and instructors in Economics 401-402. Other graduate students may be admitted with consent of instructor.

816-817-818. Modern Economic Theories. Three credit hours. Autumn, Winter, Spring Quarters. Mr. Wolfe.

A course designed to acquaint the student with the contributions to theory of the chief economic writers of the last half-century and to examine analytically and critically modern theories of value and distribution.

819-820-821. French and German Economics. Two credit hours. Autumn, Winter, Spring Quarters. Open to graduate students who have had not less than one year's training in French and the same amount in German. Mr. Held.

A study of selected works of French and German economists of the last half-century. Students who expect to take the examination for the Doctor's degree will find this course a valuable aid in acquiring a reading knowledge of French and German.

822-823-824. Seminary in Economics and Statistics. Two credit hours. Autumn, Winter, Spring Quarters. All instructors.

Graduate students and the instructors in the department will meet regularly for the presentation of the results of investigation, the review of current economic literature, and the discussion of current problems.

828-829-830. Research in Labor Problems and Legislation. One to three credit hours. Autumn, Winter, Spring Quarters. Mr. Hammond.

Graduate students especially interested in these problems will make their investigations under direction of the instructor.

831-832-833. Railroad Rates and Rate Control. One to three credit hours. Autumn, Winter, Spring Quarters. Mr. Ruggles.

A study of the theory of railroad rates in the United States and in European countries. Special emphasis is placed on railroad rates and rate control in the United States since 1906.

835-836-837. Theories of Public Utility Rates in Europe and the United States. One to three credit hours. Autumn, Winter, Spring Quarters. Mr. Ruggles.

A study of the various theories of utility rate making in the leading European countries and the United States.

839-840-841. Research in Corporation Economics and Trust Problems. One to three credit hours. Autumn, Winter, Spring Quarters. Prerequisite, the permission of the instructor. Mr. Hoagland.

Individual investigations with group discussions participated in by those investigating related subjects.

845-846-847. Research in Money and Banking. One to three credit hours. Autumn, Winter, Spring Quarters. Mr. Dice, Mr. Buchanan.

The work under this head will consist of study made of special problems in the field of money and banking. Each student in conference with the instructor in charge will choose some problem along his line of interest. Large emphasis will be placed on field work. It is expected that each student will make a more or less prolonged study of his problem, from time to time present the material he has gathered in the form of reports, and write a paper which shall represent the work complete.

851-852-853. Research in Public Finance. One to three credit hours. Autumn, Winter, Spring Quarters. Prerequisite, the permission of the instructor. Mr. Walradt.

A course intended for graduate students who have a desire to do special work along this line.

854-855-856. Research in Theories and Problems of International Trade. One to three credit hours. Autumn, Winter, Spring Quarters. Prerequisite, the permission of the instructor. Mr. Held.

Students writing theses or specializing in this field may carry on their investigations under the direction of the instructor.

857-858-859. Research in Economic Theory. One to three credit hours. Autumn, Winter, Spring Quarters. Prerequisite, the permission of the instructor. Mr. Wolfe.

Students interested in advanced theoretical work may write their dissertations in connection with this course.

860-861-862. Research in Statistics. One to two credit hours. Autumn, Winter, Spring Quarters. Mr. Croxton.

The application of statistical methods to economic problems and economic theory. Research of a statistical nature may be carried on in this course.

ELECTRICAL ENGINEERING

Office, 171 Robinson Laboratory

PROFESSORS CALDWELL AND WRIGHT, ASSISTANT PROFESSORS PUCHSTEIN, SHEPARDSON, AND KIMBERLY, MR. LLOYD, MR. TANG

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in mathematics and physics, and the permission of the instructor, in addition to any prerequisites stated in the description of the courses.

601. Direct Current Equipment. Five credit hours. One Quarter. Autumn and Spring. Three class hours and three laboratory hours each week. Prerequisite, Mechanics 601. Mr. Lloyd, Mr. Tang.

Generators and motors; a study of their theory, construction, and operation.

605. Alternating Current Circuits and Equipment. Five credit hours. One Quarter. Autumn and Winter. Three class hours and three laboratory hours each week. Prerequisite, Mechanics 601. Mr. Caldwell, Mr. Shepardson.

Inductance, capacity, reactance, impedance, series and parallel circuits, power, power factor, polyphase systems. General survey of alternators, transformers, and motors.

611. Medium and High Frequency Currents. Five credit hours. One Quarter. Winter and Spring. Three class hours and one three-hour laboratory period each week. Prerequisite, Electrical Engineering 605. Mr. Wright, Mr. Tang.

An elementary treatment of communication circuits and apparatus, inductive interference between parallel telephone and power transmission lines, vacuum tubes, radio circuits, and high-frequency alternating current measurements.

This course is not open to students who have credit for Electrical Engineering 610 or 615.

620. Applications, Control, and Problems. Three credit hours. Spring Quarter. Three class hours and three calculation hours each week. Prerequisites, Electrical Engineering 601 and 605. Mr. Caldwell and others.

A brief treatment of the uses of electricity in illumination, railways, manufacturing, mining, control, etc.

630. Electrical Engineering. Five credit hours. Winter Quarter. Three class hours and four laboratory hours each week. Mr. Lloyd.

Electrical circuits, machinery, and transmission, with particular reference to the operation of electrical machinery.

635. Electrical Equipment. Three credit hours. Spring Quarter. Two class hours and two problem hours each week. Prerequisite, Electrical Engineering 630. Mr. Lloyd.

The layout and cost of electrical equipment.

640. Electrical Engineering. Two credit hours. Winter Quarter. Two class hours each week. Mr. Shepardson.

The elementary theory of direct and alternating current circuits, generators, motors, and other equipment.

641. Electrical Engineering. Five credit hours. Spring Quarter. Two class hours and two three-hour laboratory periods each week. Prerequisite, Electrical Engineering 640. Mr. Shepardson.

Theory, operating characteristics, and applications of direct and alternating current generators, motors, and other equipment.

701. Alternating Current Equipment. Three credit hours. One Quarter. Autumn and Winter. Three class hours each week. Prerequisites, Electrical Engineering 601 and 605; concurrent, Electrical Engineering 705. Mr. Caldwell.

Advanced treatment of transformers, induction motors, and other equipment.

702. Alternating Current Equipment. Three credit hours. One Quarter. Autumn and Winter. Three class hours each week. Prerequisites, Electrical Engineering 601 and 605; concurrent, Electrical Engineering 706. Mr. Puchstein.

Advanced treatment of alternators, synchronous motors, convertors, and other equipment.

705. Alternating Current Laboratory. Four credit hours. One Quarter. Autumn and Winter. Five laboratory hours each week. Concurrent, Electrical Engineering 701. Mr. Kimberly.

Testing of transformers, induction motors, and storage batteries.

706. Alternating Current Laboratory. Four credit hours. One Quarter. Autumn and Winter. Five laboratory hours each week. Concurrent, Electrical Engineering 702. Mr. Kimberly.

Testing of alternators, synchronous motors, convertors, and other equipment.

710. Electric Utilities Engineering. Four credit hours. Autumn Quarter. Three class hours and three problem hours each week. Prerequisite, Electrical Engineering 601. Mr. Shepardson.

A study of railway operation and the application of electric motors to train propulsion. Traffic studies, electric motor characteristics, and control system. Speed-time and other performance curves. Power distribution. Electric traction systems. Locomotive train haulage and the application of electric traction to trunk line railways.

715. Telephone Communication. Four credit hours. Autumn Quarter. Three class hours and three laboratory hours each week. Prerequisite, Electrical Engineering 611. Mr. Wright.

Advanced study of telephone circuits, characteristics of medium frequency telephone apparatus, design of electrical filters, loading and theory of propagation of current and voltage waves over long circuits.

720. Electrical Illumination. Four credit hours. Autumn Quarter. Three class hours and three laboratory hours each week. Mr. Caldwell.

Modern lighting, industrial, commercial, auditorium, residence, street, etc. Light sources and accessories, reflection, absorption, transmission, glare, diffusion, color, etc.

722. Electrical Illumination. Three credit hours. Autumn Quarter. Three class hours each week. This course coincides with the class work of Electrical Engineering 720. Mr. Caldwell.

Modern lighting, industrial, commercial, auditorium, residence, street, etc. Light sources and accessories, reflection, absorption, transmission, glare, diffusion, color, etc.

725. Radio Communication. Four credit hours. Winter Quarter. Three class hours and three laboratory hours each week. Prerequisite, Electrical Engineering 611. Mr. Wright.

Production, transmission, detection and amplification of damped and undamped oscillations as applied to radio communication, theory, and application.

726. Advanced Electrical Communication. Four credit hours. Spring Quarter. Three class hours each week. Prerequisite, Electrical Engineering 725. Mr. Higgy.

The production, transmission, detection and amplification of damped and undamped oscillations as applied to radio telegraphy and telephony.

730. Electrical Design. Four credit hours. Winter Quarter. Three three-hour calculation periods each week. Prerequisite, Electrical Engineering 701 or 702. Mr. Puchstein.

Design procedure and theory of magnets, direct current dynamos, transformers, etc.

731. Advanced Electrical Design. Three credit hours. Spring Quarter. Two three-hour calculation periods each week. Mr. Puchstein.

This course is a continuation of Electrical Engineering 730. Design procedure and design theory of alternating and current apparatus, synchronous, asynchronous, commutator, and transforming.

735-736. Thesis. Three credit hours, 735, any Quarter. Five credit hours, 736, any Quarter. Prerequisites, Electrical Engineering 601 and 605. All instructors.

740. Electrical Transmission and Distribution. Three credit hours. Spring Quarter. Three class hours each week. Prerequisite, Electrical Engineering 702, or 775 and 776. Mr. Puchstein, Mr. Kimberly.

The theory and economics of transmission and distribution systems and apparatus and their organization and operation.

745. Advanced Electrical Engineering Laboratory. Four credit hours. Spring Quarter. Five laboratory hours each week. Prerequisites, Electrical Engineering 702, 706. Mr. Kimberly and others.

Advanced testing of alternating current and other equipment.

760-761-762. Special Advanced Reading. Credit hours to be arranged. Three Quarters. All instructors.

765-766-767. Special Advanced Laboratory. Credit hours to be arranged. Three Quarters. All instructors.

Selected tests on illumination, railway, telephone, radio, and other electrical equipment.

770. The Application of Hyperbolic Functions to Electrical Engineering Problems. Three credit hours. Spring Quarter. Two three-hour calculation periods each week. Prerequisite, Electrical Engineering 702; concurrent, Electrical Engineering 740. Mr. Puchstein.

Operations with plane vector and hyperbolic quantities and their application to powerlines, artificial lines, communication, railway signalling, current distribution in armature conductors, etc.

775. Electrical Engineering. Four credit hours. One Quarter. Autumn and Winter. Two class hours and four laboratory hours each week. Mr. Lloyd, Mr. Tang.

Characteristics and principles of operation of direct current generators, motors, control systems, and storage batteries.

This course is not open to students who have credit for Electrical Engineering 601.

776. Electrical Engineering. Four credit hours. One Quarter. Autumn and Winter. Two class hours and four laboratory hours each week. Mr. Puchstein, Mr. Shepardson.

Alternating current circuits and the characteristics, operation, and applications of alternating current generators, motors, transformers, and other equipment.

This course is not open to students who have credit for Electrical Engineering 605.

780. Engineering Field Problems. Two credit hours. Spring Quarter. Two class periods each week. Elective. Prerequisites, Electrical Engineering 701 and 702. Mr. Kimberly.

A study of problems found in electrical engineering practice.

785. Electrical Utilities Engineering. Four credit hours. Autumn Quarter. Three class periods and one four-hour laboratory period each week. Prerequisite, Electrical Engineering 611. Mr. Wright, Mr. Tang.

The engineering design and economics of electrical communication systems.

FOR GRADUATES

Prerequisite for Graduate Work: Graduate work in electrical engineering presupposes the requisite foundation courses in mathematics, physics, and electrical measurements.

For major work a candidate must hold a baccalaureate degree in Electrical Engineering.

Graduate work will be given to individual students and groups under the course numbers given below. This work will be in charge of the instructors as here indicated. Mr. Caldwell, alternating current theory and equipment illumination. Mr. Wright, wave forms, transient phenomena, radio, high frequency currents, telephone, telegraph.

Mr. Kimberly, electrical instruments, alternating current equipment, application of mathematics to electrical engineering. Mr. Puchstein, electrical machine design, transmission. Mr. Shepardson, electric traction.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Advanced Theoretical Study of Electrical Engineering Practice and Equipment. Credit hours to be arranged.

805-806-807. Advanced Laboratory Study of Electrical Engineering Equipment. Credit hours to be arranged.

811-812-813. Research Work. Credit hours to be arranged.

ENGINEERING DRAWING

Office, 218 Brown Hall

PROFESSOR FRENCH, ASSISTANT PROFESSOR PAFFENBARGER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in engineering drawing, and the permission of the instructor, in addition to any prerequisites stated in the description of the courses.

701. Chemical Machine Drawing. Two credit hours. Autumn Quarter. Six laboratory hours each week. Mr. Paffenbarger.

The drawing and design of machinery and apparatus as related to industrial chemistry.

702. Chemical Plant Layout. Two credit hours. Winter Quarter. Six laboratory hours each week. Prerequisite, Engineering Drawing 701. Mr. Paffenbarger.

The sketching, drawing, and preliminary layout of industrial chemical plants.

703. Chemical Plant Design. Two credit hours. Spring Quarter. Six laboratory hours each week. Prerequisite, Engineering Drawing 702. Mr. Paffenbarger.

The design and drawing of a complete plant for the manufacture of a chemical or related product.

NOTE: TEACHING COURSES. For the Teaching Courses in this department see the Department of Principles of Education, Courses 750 and 751.

ENGLISH

Office, 103 Mendenhall Laboratory

PROFESSORS DENNEY, TAYLOR, McKNIGHT, GRAVES, KETCHAM, BECK, ANDREWS, AND PERCIVAL, ASSISTANT PROFESSORS SMITH AND WALLEY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Courses 636, 651, 657, and 658 require four Quarters in English; 643 and 659 require six Quarters in English; and the remaining courses require five Quarters in English. The preceding requirements are in addition to any prerequisites stated in the description of the courses.

636. Eighteenth Century Poetry and Prose. Five credit hours. One Quarter. Autumn and Spring. Lectures, quiz, readings. Mr. Percival.

A study of the classical, romantic, realistic and sentimental literature of the eighteenth century. Representative prose, poetry, and drama. Especial attention will be given to a study of the life and times of Dr. Samuel Johnson.

639. The Essay. Five credit hours. Spring Quarter. Lectures, critical study, quiz. Mr. Beck.

The origin and development of the English essay as a literary type.

643. Literature and Composition. Five credit hours. Winter Quarter. Three lectures with conferences on individual work each week. Special permission necessary. Mr. Andrews.

Recent writers, Kipling, Wilde, Yeats, Symons, James, Galsworthy, Wells, Conrad, Chesterton, Masefield, and a few others will be read and discussed as a basis for creative and critical writing. Conferences on individual work.

646. Middle English. Three credit hours. Spring Quarter. Prerequisites, English 651 and 652. Mr. Smith.

Grammar and reading of selected texts.

651. Old English. Three credit hours. Autumn Quarter. Lectures, quiz, readings. Mr. Bloomfield.

Grammar and reading of selected texts.

652. Old English Poetry. Three credit hours. Winter Quarter. Prerequisite, English 651. Mr. Smith.

Beowulf and other assigned texts.

653. Chaucer and His Principal Contemporaries and Successors. Five credit hours. Winter Quarter. Lectures, quiz, readings. Class enrollment limited to thirty. Italian 609 and 610 are recommended as concurrent studies. Mr. McKnight.

Chaucer's principal works are read. Consideration is also given to Gower, Wycliffe, Langland, the author of Sir Gawayne and the Grene Knight, Occleve, Lydgate, Barbour, James I of Scotland, Dunbar, etc.

654. English Medieval Literature to Chaucer. Five credit hours. Autumn Quarter. Lectures, quiz, readings. Mr. McKnight.

A study of epic poetry in early English, followed by a study of legends, romances, tales, and metrical histories, all done by means of modern English renderings.

655. The Novel: Richardson to Scott. Five credit hours. One Quarter. Autumn and Spring. Lectures, quiz, readings. Mr. Taylor.

The history and development of the novel in this period is given by lecture. Reading and criticism of Richardson, Fielding, Sterne, Jane Austen, and Scott.

656. The Novel: Dickens to Meredith. Five credit hours. Winter Quarter. Lectures, quiz, readings. Mr. Taylor.

The history and development of the novel in this period is given by lecture. Reading and criticism of Dickens, Thackeray, Trollope, George Eliot, Meredith, Hardy, and James.

657. Versification. Five credit hours. Winter Quarter. Lectures, reading, practice. Special permission necessary. Class enrollment limited to thirty. Mr. Graves.

The theory of verse structure with a history of the principal English rhythms, and practice in verse composition.

658. The Short Story. Five credit hours. Autumn Quarter. Lectures, quiz, readings. Special permission necessary. Class enrollment limited to thirty. Mr. Graves.

Lectures on structure and form in the short story, with class reports on assigned readings, and practice in story writing.

659. Milton and Dryden. Five credit hours. Autumn Quarter. Four meetings each week and a fifth meeting at the option of the instructor. Italian 609 and 610 are recommended as concurrent studies. Mr. Andrews.

Seventeenth century literature with special reference to Milton. The poetry of Milton, Donne, the Cavaliers, the church poets, and Dryden. The prose of Walton and the character books; Browne, Burton, and Bunyan. The Restoration dramatists.

664. The Celtic Renaissance. Five credit hours. Spring Quarter. Four meetings each week and a fifth meeting at the option of the instructor. Class enrollment limited to twenty. Mr. McKnight.

Subjects for study: The Ossianic literature of the eighteenth century, Lady Guest's translation of the Welsh Mabinogion and the English literary works inspired by the translation. The modern revival of ancient Irish story and the related modern literature by Yeats, Lady Gregory, Fiona Macleod, Synge, and others.

This course is not open to students who have credit for English 813.

667. Shakespeare: Histories and Tragedies. Five credit hours. Autumn Quarter. Two lectures, two quiz hours, one hour written criticism each week. Italian 609 and 610 are recommended as concurrent studies. Mr. Denney.

668. Shakespeare: Comedies and Romances. Five credit hours. Winter Quarter. Two lectures, two quiz hours, one hour written criticism each week. Italian 609 and 610 are recommended as concurrent studies. Mr. Denney.

670. Recent and Contemporary Drama. Five credit hours. Spring Quarter. Four meetings each week with special reading in lieu of the fifth meeting. Prerequisite, English 667 or 668. Mr. Andrews.

One or two plays of each of the leading dramatists since Ibsen will be read, the foreign plays in translation. The authors considered will be Ibsen, Strindberg, Hauptmann, Suderman, Schnitzler, Brieux, Hervieu, Wilde, Pinero, Jones, Barker, Galsworthy, Shaw, Rostand, Maeterlinck, Yeats, Synge.

672. Shakespeare's Contemporaries and Predecessors in English Drama. Five credit hours. Spring Quarter. Four meetings each week and a fifth meeting at the option of the instructor. Prerequisite or concurrent, English 667 and 668. Class enrollment limited to thirty. Mr. Denney.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 715.

FOR GRADUATES

Prerequisite for Graduate Work: For graduate work in this department the student should have a reading knowledge of at least two languages besides English, and not less than twenty semester hours or thirty Quarter-hours in undergraduate English courses. He should also be familiar with the outlines of English and American history.

In awarding fellowships in English, other things being equal, preference will be given to the candidate whose previous training has included courses in Latin, Greek, German, French, English history, American history, psychology, the history of philosophy, esthetics, and at least twenty semester hours or thirty Quarter-hours in English including at least one course in Old and Middle English.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. History of the Short Narrative in English. Two credit hours. Autumn Quarter. One two-hour session each week. Mr. Graves.

An investigation of types of the short story in English, from the Middle Ages to the present.

802. The Lyric. Two credit hours. Winter Quarter. One two-hour session each week. Mr. Graves.

A study of the characteristics of lyrical poetry with a history of the lyric in English literature.

805. Studies in Criticism. Two credit hours. Autumn Quarter. One two-hour session each week. Mr. Denney.

Topic for 1926-1927: Recent Criticism of American Literature.

806. Studies in the Drama. Two credit hours. Winter Quarter. One two-hour session each week. Mr. Denney.

Topic for 1926-1927: Problems in Shakespeare's History Plays.

807. The Later Novel. Two credit hours. One Quarter. Autumn and Spring. One two-hour session each week. Mr. Taylor.

Topics for 1926-1927: Autumn, Meredith; Spring, James.

808. Studies in the Poets. Two credit hours. Winter Quarter. One two-hour session each week. Mr. Taylor.

Topic for 1926-1927: Tennyson.

809. English and Scottish Popular Ballads. Three credit hours. Spring Quarter. One three-hour session each week. Mr. McKnight.

810. English Usage. Three credit hours. Winter Quarter. One two-hour session each week. Mr. McKnight.

811. Old and Middle English Philology. Three credit hours. Autumn Quarter. One two-hour session each week. Prerequisites, English 651, 652, and 646. Mr. McKnight.

Topic for 1926-1927: Studies in the English Renaissance.

815. Studies in Seventeenth Century Literature. Five credit hours. One Quarter. Autumn and Spring. One two-hour session each week. Prerequisite or concurrent, English 659 and 672. Mr. Andrews, Mr. Walley.

Topics for 1926-1927: Autumn, Jacobean Drama, Mr. Walley; Spring, Restoration Drama, Mr. Andrews.

816. Studies in Poetic Rhythm. Two credit hours. Spring Quarter One two-hour session each week. Mr. Andrews.

818. Studies in Eighteenth Century Literature. Five credit hours. One Quarter. Autumn and Winter. Two sessions each week. Mr. Percival.

The topic for 1926-1927 will be chosen from the following list: The Novel in the Eighteenth Century, The Beginnings of Romanticism, Studies in Boswell's Life of Johnson, Literary and Social Backgrounds.

819-820-821. Discussion of Dissertations. Two to five credit hours. Autumn, Winter, Spring Quarters. Individual investigations. Mr. Denney, Mr. Taylor, Mr. Graves, Mr. McKnight, Mr. Andrews, Mr. Percival.

PUBLIC SPEAKING

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in English and public speaking.

625. The Forms of Public Address. Five credit hours. One Quarter. Autumn and Spring. Mr. Ketcham.

A study of the methods of the foremost American and English orators. Class discussions. Practice in the use of different forms of public address. Formal orations; inaugurals; nominating speeches; after-dinner speaking; discussions of current events; political, business, and social addresses.

This course is not open to students who have credit for Public Speaking 525.

651. Special Problems in the Theory of Public Speaking. Five credit hours. Spring Quarter. Mr. Ketcham.

The function of the public speaker in reforms, revolutions, and public movements. Criticism and appreciation. Ideals, aesthetic standards in public speaking. Each student is required to make investigations in some special problem and to bring his results before the class for discussion.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 760.

ENTOMOLOGY

(See Zoology and Entomology)

EUROPEAN HISTORY

(See History)

FARM CROPS

Office, 101 Horticulture Building

PROFESSOR PARK, ASSISTANT PROFESSOR WILLARD, MR. BORST

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in botany and farm crops. Course 602 requires also a fundamental course in zoology.

601. Special Crops. Three credit hours. Autumn Quarter. Two lectures and one two-hour laboratory period each week. Mr. Willard.

This course is a study of tobacco, sugar beets, and other crops of great local interest which are not taken up in the general courses. The work is largely individual, and the student may put the greater part of his time on the crop or crops of most interest to him.

602. Plant Breeding. Five credit hours. Winter Quarter. Four lectures and one two-hour laboratory period each week. Mr. Park.

Application of the principles of genetics to the breeding of our important agricultural plants. Laboratory study of cereal hybrid populations, practice in crossing plants, and study of the technique involved in plant breeding work.

603. Crop Experimentation. Three credit hours. Spring Quarter. Two lecture periods and the equivalent of two laboratory hours each week. Mr. Borst.

This course is a brief study of the methods of crop experimentation in the field, the sources of error involved and the interpretation of results. It is intended for those preparing for research or teaching in farm crops or related lines. Several trips will be taken, including one to Wooster.

605. Advanced Grain Grading and Judging. Five credit hours. Autumn Quarter. Ten laboratory hours each week. Mr. Willard, Mr. Borst.

A course for students desiring further training in the handling of farm crops including market grading, judging, and identification of grains and forage crops. Trips to local fairs for practice will be arranged where possible.

701. Special Problems. Three to fifteen credit hours. May be taken in units of three to five credit hours for one, two, or three Quarters. Autumn, Winter, Spring Quarters. Prerequisite, the consent of the instructor. Mr. Park, Mr. Willard.

Special problems in the culture, utilization, classification, grading, breeding, and improvement of farm crops may be studied in the field, laboratory, or library.

FOR GRADUATES

Prerequisite for Graduate Work: As a prerequisite for graduate work in farm crops students must have had at least one year's work in college botany, one year's work in college chemistry, an introductory course in soils, and one year's work in farm crops.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Research in Plant Breeding and Crop Production. Five to ten credit hours. Any Quarter. Mr. Park, Mr. Willard.

802. Seminary. One credit hour. Autumn, Winter, Spring Quarters. Required of all graduate students majoring in farm crops.

FINE ARTS

Office, 201 Hayes Hall

PROFESSORS HOPKINS AND FANNING, MR. FREY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in fine arts and the permission of the instructor.

655. History of Seventeenth Century Art. Five credit hours. Winter Quarter. Alternates with Fine Arts 656. Five lectures each week. Prerequisite, junior standing. Mr. Fanning.

The development of European art during the seventeenth century. Illustrated lectures, reading, and reports.

***656. History of Oriental Art.** Five credit hours. Winter Quarter. Five lectures each week. Prerequisite, junior standing. Mr. Fanning.

The study of Asiatic culture expressed by the historical development of architecture, sculpture, and painting in Persia, India, China, and Japan. Illustrated lectures, reading, and reports.

657-658-659. Proseminary. Five credit hours. Autumn, Winter, Spring Quarters. Mr. Fanning.

Specialized study in important European art periods. Ancient art subjects in Autumn, medieval in Winter, renaissance and modern in Spring. Lectures, round-table discussions, and presentation by each student of some special phase of research.

661-662-663. Advanced Technical Problems. Three to five credit hours. Autumn, Winter, Spring Quarters. Mr. Hopkins, Mr. Fanning, Mr. Frey.

This course is open, by permission of the department, to students who have shown particular ability in drawing, painting, or sculpture and who wish to pursue advanced problems in these fields under the supervision of the department.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Major Problems. Three to five credit hours. Autumn, Winter, Spring Quarters. Mr. Hopkins, Mr. Fanning, Mr. Frey.

This course is open, by permission of the department, to graduate students who are qualified to do original work in research, painting, or sculpture.

FRENCH

(See Romance Languages and Literatures)

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* Not given in 1926-1927.

GEOGRAPHY

Office, 213 Commerce Building

PROFESSORS HUNTINGTON, VAN CLEEF, AND PEATTIE,
ASSISTANT PROFESSOR CARLSON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in geography and economics in addition to any prerequisites stated in the description of the courses.

601. Historical Geography and Commerce of the United States. Three credit hours. One Quarter. Winter and Spring. Three recitations each week. Mr. Huntington.

Geographic influences in the history of the United States. Location, topography, climate, and natural resources as factors in the distribution of population, the selection of occupations and the location of industries and trade routes. The development of the internal commerce of the United States, and the basis of her foreign trade.

603. The Localization of Manufacturing Industries of the United States. Four credit hours. Spring Quarter. Four recitations each week. Mr. Carlson.

Geographic influences on American manufacturing. The distribution of the industry in the United States. The relation of land and population to the growth and variety of manufacturers. Factors affecting the localization of particular industries. The development of centers of general industry. Industrial districts. Classification and analysis of the manufacturing business of the United States as a whole, and special study of representative industries, as to labor, supply, sources, quantity, and value of material and power used, transportation facilities available, quantity and value of products, and problems of competition and markets. A term report will be required of each student.

604. Conservation of Natural Resources. Two credit hours. Autumn Quarter. Two recitations each week. Mr. Huntington.

The importance of the fundamental natural resources: agricultural, forest, mineral, and water. The exploitation of soils, forests, mines, etc., and the movement for their conservation. The reclamation of arid and swamp land, reduction of erosion, development of forestry, elimination of waste in mining, improvement of waterways, use of water power, and problems of water supply.

605. Economic and Social Geography of Ohio. Two credit hours. Winter Quarter. Two recitations each week. Mr. Huntington.

Geographic influences in the history of the state. A study of its agriculture, industries, and social conditions, together with the underlying physical, climatic, and other environmental factors that have contributed to the present development of the region.

606. Land Utilization. Two credit hours. Spring Quarter. Mr. Huntington.

Land as a natural resource. Its importance and classification. A discussion of agricultural, forest, mineral, and urban lands. Character and location as factors in utilization and value. The relation of classification to land policies and conservation policies. City planning, zoning, and suburban development.

621. Economic and Social Geography of Europe. Three credit hours. Autumn Quarter. Three recitations each week. Mr. Van Cleef.

A study of the human geography of Europe. The racial geography of the continent and the influences of geographic environment in the economic, social, and political progress of the various nations.

623. The Political Geography of South America. Three credit hours. Autumn Quarter. Three recitations each week. Mr. Carlson.

A study of South America by countries. Location, topography, climate, and natural resources, influencing economic, social, and political development. The commercial relations of South America, with particular reference to the United States.

624. The Caribbean Region and the Panama Canal. Three credit hours. Winter Quarter. Three recitations each week. Mr. Carlson.

The geography of the regions between the United States and South America. Their resources, industries, and products. The economic and social development of their people and the nature and relations of their trade, particularly with the United States. The commercial and strategic importance of the Panama Canal to both the Americas.

625. The Economic Geography of the Far East. Three credit hours. Spring Quarter. Three recitations each week. Mr. Peattie.

The geographical aspects of the economic and political problems of the Pacific Ocean. The ratio of land to population in the islands and lands adjacent to this ocean and the resultant economic, social, and political consequences. Their undeveloped resources and the opportunity for the investment of American capital. The present and prospective commercial relations of the United States with Asia and Australasia.

631. The Geography and History of Commerce. Three credit hours. Spring Quarter. Three recitations each week. Mr. Peattie.

A study of the basis and development of commerce from earliest times to the present. The successive leadership among the nations and the contributing factors. Geographic influences in present-day national commercial policies and in modern business.

632. World Industries. Three credit hours. Autumn Quarter. Three recitations each week. Mr. Carlson.

A survey of the world's important agricultural and manufacturing industries and the geographic factors influencing their location and development.

633. World Commerce. Three credit hours. Winter Quarter. Three recitations each week. Mr. Van Cleef.

The exchange of commodities, the direction of movement, and the balance of trade. The relation of trade balances to industrial development. The possible world's markets for the American merchant.

634. Trade Centers and Trade Routes. Three credit hours. One Quarter. Winter and Spring. Three recitations each week. Mr. Van Cleef.

The world's principal ports, inland trade centers, and trade routes are considered in the light of both domestic and foreign trade development. A study of geographic

factors in the establishment and growth of trade centers. The reciprocal relations in the development of the hinterland and trade centers.

The world's great trade routes, including land as well as water routes and their effect upon the shifting of trade centers. The significance of inland waterways in trade. The influence of the automobile, airplane and airship upon routes. The work of a port. Planning for its future.

The part played by postal, telegraph, cable, wireless, and radio communication in the world's trade. Coaling stations, their location, strategic and economic importance.

641. Field Work in Geography and Commerce. One to three credit hours. One Quarter. Autumn and Spring. Prerequisite, Geography 601 or 631, or consent of instructor. Mr. Huntington, Mr. Van Cleef, Mr. Peattie, Mr. Carlson.

Special investigations in the field of applied geography. Each student will be required to write up the results of his work in the form of maps, diagrams, and a final typewritten report. Assigned readings, conferences, and reports.

661. Geographic Factors in Civilization. Three credit hours. Winter Quarter. Three recitations each week. Mr. Peattie.

A study in the principles of historical geography. The story of geographic influences in social and cultural developments. Designed for advanced students of geography, history, and sociology.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Research in Geography and Commerce. One to three credit hours. Autumn, Winter, Spring Quarters. Prerequisite, at least two years' work in geography, one year's work in economics, and consent of the instructor. Mr. Huntington, Mr. Van Cleef, Mr. Peattie, Mr. Carlson.

Assigned problems for investigation and reports under the direction of the instructor.

805-806-807. Seminary in Geography and Commerce. Two credit hours. Autumn, Winter, Spring Quarters. All instructors.

GEOLOGY*

Office, 103 Orton Hall

PROFESSORS BOWNOCKER AND CARMAN, ASSISTANT PROFESSOR SPIEKER, MR. STOCKDALE, MISS STEWART, MR. GLOCK, MR. STOUT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in geology in addition to any prerequisites stated in the description of the courses.

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* For courses in mineralogy and petrography see the Department of Mineralogy.

601. Advanced Paleontology. Three or four credit hours. Autumn Quarter. Laboratory work. Prerequisite, introductory paleontology. Mr. Carman, Miss Stewart.

The identification of faunas of various geological formations, particularly those of Ohio.

602. Advanced Paleontology. Three or four credit hours. Winter Quarter. Mr. Carman, Miss Stewart.

603. Advanced Paleontology. Three or four credit hours. Spring Quarter. Mr. Carman, Miss Stewart.

605. Economic Geology. Three credit hours. Autumn Quarter. Three recitations or lectures each week. Prerequisites, four Quarters of geology or of geology and mineralogy, and general chemistry. Mr. Bownocker.

A study of the nature of ores, their classification and origin; the metallic ores of the United States.

606. Economic Geology. Three credit hours. Winter Quarter. Three recitations or lectures each week. Prerequisites, four Quarters of geology or of geology and mineralogy, and general chemistry. Mr. Bownocker.

A study of the properties and uses of coal, the coal deposits of the United States, lime, cement, clays, etc.

607. Economic Geology. Three credit hours. Spring Quarter. Three recitations or lectures each week. Prerequisites, four Quarters of geology or of geology and mineralogy, and general chemistry. Mr. Bownocker.

A study of petroleum, asphaltum, and natural gas; their distribution, geological relations, and origin.

608. Stratigraphic Geology of Ohio. Five credit hours. Autumn Quarter. Students intending to elect this course should consult the instructor before registering. Mr. Carman.

Field trips, lectures, and assigned readings. Field trips on Saturdays (entire day) while the weather permits.

The geological formations of central Ohio are studied in the field and those formations more distant from Columbus are studied by rock specimens and assigned readings. This course is intended to acquaint the student with methods of field investigation.

This course is not open to students who have credit for Geology 405.

*609. **Petrology.** Five credit hours. Winter Quarter. Four recitations and one two-hour laboratory period each week. Prerequisite, four Quarters of geology or of geology and mineralogy, and general chemistry. This course alternates with Geology 610.

A study of the origin, mode of formation, and geologic relations of rocks, with laboratory study in rock identification.

610. **Physiography of the United States.** Five credit hours. Winter Quarter. Prerequisites, four Quarters of geology, including a fundamental course in physiography. Four recitations and one two-hour laboratory period each week. Mr. Glock.

A study of the physiographic regions of the United States. The topographic form and physiographic history with the geologic history as a background. Designed to give the student of geology a working knowledge of the United States.

This course is not open to students who have credit for Geology 403.

611. **Areal Geology.** Three to five credit hours. One Quarter. Autumn and Spring. Lectures, laboratory, and field work. Prerequisite, the consent of the head of the department. Mr. Carman, Mr. Spieker, Mr. Glock.

Instruction in the standard methods of field work and in preparing geological maps and reports. Field study and mapping of geological formations or surficial deposits of an assigned region followed by the preparation of a report.

612. **Special Problems.** Three to five credit hours. All Quarters. Assigned readings, conferences, and reports. Prerequisite, the consent of the head of the department.

A study of special topics, conferences, and reports.

615. **Geological Surveying.** Five credit hours. Spring Quarter. Two recitations and three field or laboratory periods each week. Prerequisite, four Quarters in geology. Students intending to elect this course should consult the instructor. Class limited to six. Mr. Stockdale.

A study of the construction and interpretation of topographic and geologic maps, with special emphasis on instrument and map work in connection with oil surveying. Field practice in various methods of triangulation, traversing, and topographic sketching. Instruments used include plane table, telescopic alidade, open sight alidade, aneroid barometer, hand level, stadia, and compass.

616. **Clays.** Five credit hours. Winter Quarter. Recitations, lectures, and assigned readings. Prerequisite, four Quarters of geology and general chemistry. Mr. Stout.

The properties, distribution, uses, and origin of clays. Emphasis will be given to the clays of Ohio.

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* Not given in 1926-1927.

618. Principles of Sedimentation and Stratigraphy. Five credit hours. Spring Quarter. Four lectures and one conference each week. Mr. Spieker.

The origin, constitution, and relationships of stratified rocks; an approach to the outstanding problems of stratigraphy, in which attention is given chiefly to processes of sedimentation and their results, the interpretative study of sedimentary rocks, and the general problems of correlation.

620. Introductory Paleontology. Three credit hours. Autumn Quarter. Two recitations and one two-hour laboratory period each week. Prerequisite, four Quarters of geology or of geology and zoology. Mr. Carman, Miss Stewart.

A study of the systematic classification of the animal kingdom as a means of becoming acquainted with the faunas that characterize the various geological formations. The course deals mainly with the generic and specific characters of the fossil invertebrates and their use in identifying and correlating geological formations.

This course is not open to students who have credit for Geology 408.

621. Introductory Paleontology. Three credit hours. Winter Quarter. Mr. Carman, Miss Stewart.

This course is a continuation of Geology 620.

This course is not open to students who have credit for Geology 409.

622. Introductory Paleontology. Three credit hours. Spring Quarter. Mr. Carman, Miss Stewart.

This course is a continuation of Geology 621.

This course is not open to students who have credit for Geology 410.

FOR GRADUATES

Prerequisite for Graduate Work: The courses named below presuppose two years' work of collegiate character in geology, which will usually consist of the general courses in physiography and inorganic and historical geology. If the student intends to specialize in historical geology he should have had, in addition to the above, courses in chemistry, zoology, and botany; if in inorganic geology, courses in chemistry, physics, and mineralogy; if in physiography, courses in physics and chemistry.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Advanced Historical Geology. Three credit hours. Autumn Quarter. Lectures and laboratory. Prerequisite, six courses in geology. Mr. Carman.

A study of the physical history of the North American continent and of the life development which has taken place upon it. The lithology, subdivisions, geographical distribution, and fossils of each system are studied and from these the geological history of the time is interpreted.

802. Advanced Historical Geology. Three credit hours. Winter Quarter. Mr. Carman.

This course is a continuation of Geology 801.

803. Advanced Historical Geology. Three credit hours. Spring Quarter. Mr. Carman.

This course is a continuation of Geology 802.

804. Research Work. Three to five credit hours. Autumn Quarter. Field, laboratory, and library study. Outline of work and time will be arranged with individual students.

805. Research Work. Three to five credit hours. Winter Quarter.

This course is a continuation of Geology 804.

806. Research Work. Three to five credit hours. Spring Quarter.

This course is a continuation of Geology 805.

GERMAN

Offices, 2, 3, 4 Page Hall

PROFESSORS M. B. EVANS, EISENLOHR, AND BLOOMFIELD, ASSISTANT PROFESSORS THOMAS AND FEISE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for Courses in This Group: Proseminary, 675, and 685 require six Quarters of German; 665 and 695, the permission of the instructor.

Proseminary: Eighteenth and Nineteenth Century Literature. Three credit hours. Autumn, Winter, Spring Quarters. Three hours lecture and quiz each week. All instructors.

This group of courses is intended to serve as an introduction to a more intensive study of German literature. There will be informal lectures in German and English, discussions and reports. The list of authors to be studied will vary from year to year.

631. Autumn Quarter, 1926. Heinrich Heine: Life and Works. Miss Thomas.

621. Winter Quarter, 1927. Lessing: Nathan der Weise and selections from critical writings. Mr. Eisenlohr.

632. Spring Quarter, 1927. Friedrich Hebble: Life and Works. Mr. Evans.

655. Phonetics. Three credit hours. Autumn Quarter. Three hours lecture and quiz each week. Mr. Bloomfield.

Speech sounds with special reference to German, French, and English.

675. The German Language. Three credit hours. Winter Quarter. Three hours lecture and quiz each week. Mr. Bloomfield.

The study of texts illustrating the history of the German language.

685. Advanced Composition. Three credit hours. Spring Quarter. Three hours lecture and quiz each week. Mr. Eisenlohr.

An advanced course in speaking and writing German, accompanied by a review of German syntax.

695. Minor Investigations. Three credit hours. Autumn, Winter, Spring Quarters. All instructors.

Investigations of minor problems in the various fields of German literature and philology.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 725.

FOR GRADUATES

Prerequisite for Graduate Work: At least eight Quarters of work of college grade or the equivalent.

Candidates for the Master's degree should consult with the department before arranging their course.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

*801. Advanced Middle High German. Three credit hours.

*805. Gothic. Three credit hours.

*810. Old High German. Three credit hours.

855-856-857. Seminary in German Literature. Three credit hours. Autumn, Winter, Spring Quarters.

855. Autumn Quarter, 1926. The Medieval Drama in Germany. Mr. Evans.

856. Winter Quarter, 1927. Sturm und Drang. Mr. Feise.

857. Spring Quarter, 1927. Das deutsche Volkslied. Mr. Eisenlohr.

GREEK LANGUAGE AND LITERATURE

(See Classical Languages and Literature)

* Not given in 1926-1927.

HISTORY

Offices, 207, 204, 304, and 307 University Hall

PROFESSORS KNIGHT, SIEBERT, McNEAL, HOCKETT, COLE, AND WITTKE (CHAIRMAN), ASSISTANT PROFESSORS WASHBURNE, HILL, AND NOYES, MR. ROSEBOOM, MR. WEISENBURGER, MR. UTTER, MR. CLYDE, MR. LaMONTE, MR. TRYON, MR. TERHUNE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

For *all* courses in this group, the prerequisite is at least four Quarters in the social science field, of which at least two must be in history. Special prerequisites are indicated in connection with each course.

601. Introduction to Historical Research. Three credit hours. Autumn Quarter. Three class meetings each week. Prerequisites, four Quarters of history and senior standing. Required of candidates for the Master's degree. Mr. McNeal, Mr. Hockett.

Instruction in the use of standard guides and indexes, followed by a study of the principal kinds of original sources and exercises in historical criticism and composition. During most of the Quarter, the class will be divided into two sections, one dealing with problems in the European field, the other with problems in the American field, according to the major interest of the student.

This course is not open to students who have credit for American History 601 or European History 646.

602. Hellenic Civilization. Three credit hours. Spring Quarter. Three class meetings each week. Prerequisites, four Quarters of European history. Mr. .....

This course deals with the origin, development, and transmission of Greek culture. Lectures, readings, reports, and discussions.

This course is not open to students who have credit for European History 606.

***603. Roman Civilization.** Three credit hours. One Quarter. Three class meetings each week. Prerequisites, four Quarters of European history. Mr. .....

This course deals with the origin, development, and transmission of Roman culture and civilization. Lectures, readings, reports, and discussions.

This course is not open to students who have credit for European History 607.

604. French Civilization in the Middle Age. Three credit hours. Spring Quarter. Three class meetings each week. Prerequisites, History 414 and 415, and two other Quarters of history. Advanced students

* Not given in 1926-1927.

from other departments admitted without these prerequisites with the consent of the instructor. Mr. McNeal.

France at the height of the Middle Age; the growth of the French monarchy, feudal and manorial institutions, the rise of towns, art and learning.

This course is not open to students who have credit for European History 621.

*605. Germany and Italy in the Middle Age. Three credit hours. Spring Quarter. Three class meetings each week. Prerequisites, History 414 and 415, and two other Quarters of history. Advanced students from other departments admitted without these prerequisites with the consent of the instructor. Mr. McNeal.

This course is not open to students who have credit for European History 622.

*606. The Byzantine Empire and the Crusades. Three credit hours. Winter Quarter. Three class meetings each week. Prerequisites, four Quarters of European history. Reading knowledge of French is desirable. Mr. LaMonte.

A survey of the history of the Byzantine Empire from the founding of Constantinople to 1453, with special emphasis on the period of the Crusades and the relations of the Greeks to western Europe. The rise of Islam and the history of the Arabian Caliphates will also be considered. Special attention will be given to Byzantine art, literature, and the Greek Orthodox Church.

607. The Age of the Renaissance (1250-1527). Three credit hours. Autumn Quarter. Three class meetings each week. Prerequisites, European History 401-402, or History 401-402; and two other Quarters of history, or the history of education, or Fine Arts 452 and 453. Mr. Siebert.

This course deals with the rise of our modern civilization, the revolutionary change from the limited religious interest of the Middle Age through the revival of letters to the wide variety of interests in the outward world, manifested in the new painting, architecture, education, printing, science, geographical discoveries, etc. Lectures, collateral readings, and discussions.

This course is not open to students who have credit for European History 608.

608. The Period of the Reformation. Three credit hours. Winter Quarter. Three class meetings each week. Prerequisites, European History 401-402, or History 401-402; and two other Quarters of history, which may include historical courses in education or fine arts. Mr. Siebert.

This course deals with the religious reformational movements from the death of Dante (1321) to the end of the Council of Trent (1563), including the movements led

* Not given in 1926-1927.

by Wycliff, Huss, Luther, Calvin, and Zwingli, and the Counter Reformation within the Roman Catholic Church. Lectures, collateral readings, and discussions.

This course is not open to students who have credit for European History 609.

611. Constitutional History of England to 1485. Three credit hours. Autumn Quarter. Three class meetings each week. Prerequisites, four Quarters of history. Mr. Siebert.

Designed for students who are interested in the origin and development of popular government, for those taking the Arts-Law course or expecting to enter the College of Law, and for graduates. Textbook, lectures, collateral readings, and discussions.

This course is not open to students who have credit for European History 604.

612. Constitutional History of England since 1485. Three credit hours. Winter Quarter. Three class meetings each week. Prerequisites, four Quarters of history. Mr. Siebert.

A continuation of History 611. Special emphasis will be given to the evolution of parliamentary government, constitutional liberties, the growth of the cabinet and party system, Catholic emancipation, electoral reform, the Irish question, and the rise of democracy. Textbook, lectures, collateral readings, and discussions.

This course is not open to students who have credit for European History 605.

†613. England in the Tudor Period. Three credit hours. Three class meetings each week. Prerequisites, History 421 or European History 403, and two other Quarters of history. Advanced students majoring in other departments admitted by special permission. Mr. Noyes.

An intensive study of England in the period of transition, emphasizing social and political conditions, together with a brief survey of contemporary Europe. Some attention will be given to the source material of the period. Lectures, readings, reports, and discussions.

This course is not open to students who have credit for European History 625.

***614. England in the Stuart Period.** Three credit hours. Winter Quarter. Three class meetings each week. Prerequisites, History 422, or European History 404, and two other Quarters of history. Advanced students majoring in other departments admitted by special permission. Mr. Noyes.

An intensive study of England in the seventeenth century including the social, religious, and political causes of the Civil Wars, and the struggle between King and Parliament, a consideration of the Commonweath, the Restoration, and the Glorious Revolution of 1688, and the relations of this period with the settlement of North America. The work will be based to a considerable extent upon the sources for the period. Lectures, readings, reports, and discussions.

This course is not open to students who have credit for European History 626.

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* Not given in 1926-1927.

† Not given during the academic year, 1926-1927.

615. England from the Reform Bill of 1832 to 1867. Three credit hours. Winter Quarter. Three class meetings each week. Prerequisites, History 422, or European History 404, and two other Quarters of history. Advanced students majoring in other departments admitted by special permission. Mr. Noyes.

This course, with History 616, aims to survey the field of English history from 1832 to the present time. In addition to political history and international relations, social and economic factors will receive special emphasis, including the effects of the Industrial Revolution, the humanitarian movement, the various reform measures, and the intellectual attainments of the Victorian age. Lectures, readings, and discussions.

This course is not open to students who have credit for European History 627.

616. England since 1867. Three credit hours. Spring Quarter. Three class meetings each week. Prerequisites, same as for History 615. Mr. Noyes.

A survey of recent and contemporary English history, with emphasis upon the social, political, and international developments of the late Victorian and post-Victorian periods, including the movement for democracy, together with a consideration of England's part in the World War and reconstruction, and contemporary problems. Lectures, readings, and discussions.

This course is not open to students who have credit for European History 628.

621. Expansion of Europe to 1588. Three credit hours. Autumn Quarter. Three class meetings each week. Prerequisites, four Quarters of history. Mr. Washburne.

A discussion of the early contact of Europe with other countries, the period of discovery and colonization, the Portuguese empire in the East and the Spanish monopoly in the West. The survey extends to the collapse of the Iberian control of expansion by the destruction of the Armada.

This course is not open to students who have credit for European History 601.

622. Expansion of Europe to 1815. Three credit hours. Winter Quarter. Three class meetings each week. Prerequisites, four Quarters of history. Mr. Washburne.

A study of the rise of the chartered trade companies, the ascendency of the Dutch, the contest between the Dutch and the English for commercial supremacy and the long struggle between the English and the French for commercial and maritime supremacy, with its resultant effects upon India and North America. The survey extends through the settlement at the end of the Napoleonic era.

This course is not open to students who have credit for European History 602.

***623. Expansion of Europe from 1815 to the Present.** Three credit hours. Spring Quarter. Three class meetings each week. Prerequisites, four Quarters of history. Mr. Washburne.

A discussion of the problems of expansion in the nineteenth and twentieth cen-

* Not given in 1926-1927.

turies; the partition of Africa; the development of India; the movement into the southern Pacific; European interests in the Far East; modern imperialism after 1876 and its relation to the World War, with the resultant readjustment of territory.

This course is not open to students who have credit for European History 603.

624. **The French Revolution and Napoleon.** Three credit hours. Spring Quarter. Three class meetings each week. Prerequisites, History 401-402, or European History 401-402, and two other Quarters of history. Advanced students from other departments admitted without these prerequisites with the consent of the instructor. Mr. McNeal.

This course is not open to students who have credit for European History 631.

*625. **The Third French Republic.** Three credit hours. One Quarter. Three class meetings each week. Prerequisites, same as for History 624. Mr. McNeal.

This course is not open to students who have credit for European History 632.

*626. **The Near East.** Three credit hours. One Quarter. Three class meetings each week. Prerequisites, four Quarters in the field of European history. Mr. LaMonte.

This course surveys the history of the Near East from the Ottoman conquest of Constantinople in 1453 to the establishment of the Turkish Republic and the Treaty of Lausanne (1923). The rise of the Ottoman Empire, its disintegration due to the nationalist Balkan Wars and the attacks of the Powers form the chief topic of the course. Attention is also given to the constitution of the Ottoman Empire, and the history of subject races. A reading knowledge of French is highly desirable, but not required. Lectures, readings, and discussions.

This course is not open to students who have credit for European History 615.

627. **Diplomatic History of the Far East.** Three credit hours. Winter Quarter. Three class meetings each week. Prerequisite, History 426. Mr. Clyde.

This course is an advanced detailed study of the international relations of Japan and China with the western world. The course covers major events in modern Far Eastern diplomacy and attempts to explain the policies of the so-called Great Powers in the Far East, with particular reference to Russia, Great Britain, the United States, and Japan. The course covers the period from 1895 to the present. Lectures, readings, and discussions.

†628. **Recent and Contemporary European History (1919-1926).** Five credit hours. Five class meetings each week. Prerequisite, History 424, or European History 408. Mr. Washburne.

This course deals with the Treaty of Versailles and the related treaties, as also with the national and international problems of reconstruction following the attempted settlement of world conditions. It affords a survey of present-day Europe. Lectures, readings, and discussions.

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* Not given in 1926-1927.

† Not given during the academic year, 1926-1927.

631. **Constitutional History of the United States to 1837.** Three credit hours. Autumn Quarter. Three class meetings each week. Prerequisites, American History 401-402, or 403-404; or History 403-404, or 405-406; and two other Quarters in the social science field. Political Science 401 will be found a valuable adjunct to this course. Mr. Hockett.

Constitutional ideas of Americans in the Revolutionary Period, the formation of the federal Constitution; constitutional questions involved in the organization of the government, party controversies, and foreign relations; relations between the federal and state governments; the great decisions of the Supreme Court under John Marshall; the Missouri Compromise; the nullification episode. Lectures, discussions, and reports.

This course is not open to students who have credit for American History 602.

632. **Constitutional History since 1837.** Three credit hours. Winter Quarter. Three class meetings each week. Prerequisites, same as History 631. History 631 or American History 602 is a good foundation and Political Science 401 a valuable adjunct. Mr. Hockett.

Constitutional aspects of the slavery struggle, the Civil War and Reconstruction; questions relating to the power of Congress to regulate interstate commerce, levy an income tax, control trusts, etc.; constitutional problems resulting from the acquisition of territory in the War with Spain; recent amendments to the Constitution. Lectures, discussions, and reports.

This course is not open to students who have credit for American History 603.

633. **The Slavery Controversy in the United States.** Three credit hours. Autumn Quarter. Three class meetings each week. Prerequisites, American History 401-402, or 403-404; or History 403-404, or 405-406; and two other Quarters in the social science field. Mr. Cole.

The ante-bellum South and its destruction; the Civil War in the light of the forces which tended to hasten or obstruct the clash of arms.

This course is not open to students who have credit for American History 604.

634. **Reconstruction and the New South (1863-1925).** Three credit hours. Winter Quarter. Three class meetings each week. Prerequisites, same as for History 633. History 633 affords a good foundation. Mr. Cole.

The aftermath of the slavery struggle as traced in the reconstruction of the Southern States and in the readjustment of society and of the states to the new status of the negro, and to the economic forces of the last half century. Lectures, readings, reports, and discussions.

This course is not open to students who have credit for American History 605.

*635. **American Diplomacy to the Close of the Civil War.** Three credit hours. One Quarter. Three class meetings each week. Prerequisites, American History 401-402, or 403-404; or History 403-404, or 405-406; and two other Quarters in the social science field. Mr. Cole.

The foreign relations of the United States, beginning with the diplomacy which resulted in the establishment of independence and including such subjects as the struggle

* Not given in 1926-1927.

for neutral rights and commercial recognition, the extension of territory on the continent, the origin of the Monroe Doctrine, and the international controversies of the Civil War. Lectures, discussions, and reports.

This course is not open to students who have credit for American History 606.

†636. **American Diplomacy since the Civil War.** Three credit hours. Three class meetings each week. Prerequisites, same as for History 635. Mr. Cole, Mr. Hill.

Problems in the diplomacy of the United States resulting from the Civil War, the development of the Monroe Doctrine, the acquisition of dependencies, relations with Latin America and the Orient, arbitration, the Isthmian Canal, and neutral rights during the Great War in Europe. Lectures, discussions, and reports.

This course is not open to students who have credit for American History 607.

637. **Recent History of the United States (1875-1900).** Five credit hours. One Quarter. Autumn and Spring. Five class meetings each week. Prerequisites, American History 401-402, or 403-404; or History 403-404, or 405-406; and two other Quarters in the social science field. Economics 401 and 402 will be found a valuable adjunct. Mr. Knight, Mr. Wittke.

An intensive study of the political, constitutional, industrial, and social life of the nation and states from the close of the Reconstruction Period to the Spanish-American War. It includes a consideration of new applications of the Constitution, industrial development, and third party movements. Lectures, discussions, and reports.

This course is not open to students who have credit for American History 608.

638. **Recent History of the United States (1900-1925).** Five credit hours. Winter Quarter. Five class meetings each week. Prerequisites, same as for History 637. Mr. Knight.

An intensive study of the political, constitutional, industrial, and social life of the nation since the Spanish-American War. It includes the entry and participation of the United States in world politics, third party movements, rise of the new democracy, the World War and its aftermath as affecting this country. Lectures, discussions, and reports. This course is the natural continuation of History 637.

This course is not open to students who have credit for American History 609.

639. **The Influence of Racial Groups upon United States History.** Five credit hours. Spring Quarter. Five class meetings each week. Prerequisites, American History 401-402, or 403-404; or History 403-404, or 405-406; and two other Quarters in the social science field. Mr. Wittke.

The share of different immigrant groups in the building of the nation, from the colonial period to the present; with special emphasis upon the influence of immigration

† Not given during the academic year, 1926-1927.

upon American political, economic, social, and cultural development. Lectures, readings, and discussions.

This course is not open to students who have credit for American History 611.

640. **The Pioneer in American History to 1812.** Five credit hours. Autumn Quarter. Five class meetings each week. Prerequisites, American History 401-402, or 403-404, or History 403-404, or 405-406; and two other Quarters in the social science field. Mr. Hockett.

Westward expansion from the Atlantic Coast and the reasons for it; effects of the American environment; struggle with the French and Indians; plans of the British Government for the Mississippi Valley; the results of the Revolution; life of the pioneers. Lectures, discussions, and reports.

This course is not open to students who have credit for American History 612.

641. **The Pioneer in American History since 1812.** Five credit hours. Winter Quarter. Five class meetings each week. Prerequisites, same as for History 640. History 640 affords a good introduction. Mr. Hockett.

The rise of new communities; their social, economic, and political development and influence on national politics and institutions; trans-Mississippi explorations; the fur trade of the far West; territorial acquisitions; discoveries of gold and silver; transcontinental railways; Indian Wars; disappearance of the frontier. Lectures, discussions, and reports.

This course is not open to students who have credit for American History 613.

642. **International Relations of Latin America.** Five credit hours. Spring Quarter. Five class meetings each week. Prerequisites, two Quarters of history, and two other Quarters in the social science field. Mr. Hill.

The interrelations of the Latin-American states; the relations of the Latin-American states with the major nations of the world. Lectures, readings, and reports.

This course is not open to students who have credit for American History 615.

651. **The Great Historians, to the Nineteenth Century.** Three credit hours. Winter Quarter. Prerequisites, four Quarters in history, and senior standing. Required of candidates for the Doctor's degree. Mr. McNeal, with cooperation of other members of the department.

A study of the leading historical writers and schools of Europe, with selected readings from representative writers.

652. **The Great Historians of the Nineteenth Century.** Three credit hours. Spring Quarter. Prerequisites, History 651, four other Quarters of history, and senior standing. Required of candidates for the Doctor's

degree. Mr. Cole, with cooperation of other members of the department.

A study of the leading European and American writers and schools of the last hundred years.

NOTE: TEACHING COURSES. For the Teaching Courses in this department see the Department of Principles of Education, Courses 700 and 720.

FOR GRADUATES

Prerequisites for Graduate Work: Candidacy for an advanced degree presupposes good foundation courses of collegiate grade in European and American history, economics and political science.

For the requirements for the degree of Master of Arts in history, see pages 27-29.

In addition to the general requirements printed on pages 32-35, candidates for the degree of Doctor of Philosophy in history are subject to the following regulations:

For the purposes of the preliminary examination the subject is divided as follows:

DIVISION I

(1) Greek History.
(2) Roman History.
(3) Political and Institutional History of the Middle Ages.
(4) History of Continental Europe, 1300-1648.
(5) English History to 1485.

DIVISION II

(1) English History since 1485.
(2) History of Continental Europe, 1648-1871.
(3) History of Continental Europe since 1871.
(4) History of North America and the United States to 1789.
(5) History of the United States, 1789-1876.
(6) History of the United States since 1876.

DIVISION III

(1) The Expansion of Europe.
(2) The Far East.
(3) The Near East.
(4) Latin-America.
(5) Canada.

In the preliminary examination, every candidate will be required to pass an oral examination on five of the above fields (excluding the one in which his dissertation falls, which will be reserved for the final departmental examination). In defining these five fields, the candidate must select three from either Division I or II, and may select one from Division III.

It is not intended that the mere taking of courses shall be an adequate preparation for this examination. The candidate will be expected to show a knowledge of each chosen *field as a whole*, and in addition the power of organization and interpretation which are essential to the pursuit of independent research. A reasonable knowledge of the literature of each field is likewise expected. Consultation with an instructor in each field will assist in intelligent preparation for this examination. The selection of fields shall be indicated when application is made for admission to candidacy for the degree.

A sixth field, chosen from the above Divisions, to be designated as the field of the dissertation, will be made the subject of an intensive written test in the final departmental examination. With the approval of the committee in charge of the candidate's work, the field of the dissertation may be a definite portion of one of the fields listed in the Divisions. At the time of this examination, will be given also the examination

in the candidate's chosen minors. These will normally be approved fields in the other social sciences, but may for sufficient reasons be offerings in philosophy, language, and literature, or other properly correlated subjects.

For the final oral examination, see page 34.

As is indicated by the courses in the following announcement, the University offers a large opportunity for graduate work in history. The University Library contains about 25,000 volumes on history and about 10,000 additional volumes in parliamentary, congressional, and other records. Students have access also to large collections in the field of history in other libraries in the city, such as the State Library and the Library of the State Historical Society.

HISTORICAL CONFERENCE: In addition to the formal courses indicated below, a monthly conference is held, composed of the instructors and graduate students in the departments of History and Political Science. The discussions in this conference cover a wide range of topics of general interest to students and investigators in these fields.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

802-803-804. Seminary in American History. Three credit hours. Autumn, Winter, Spring Quarters. This course must be preceded or accompanied by History 601. Mr. Knight, Mr. Hockett, Mr. Cole, Mr. Wittke, Mr. Hill.

A practice course in research in American History. Students are divided into several groups, each under the guidance of a member of the department, who will determine annually the field and problems for study in his group. It is possible for properly qualified students to carry on investigations in two or more groups in the same year or in successive years. Out of these researches subjects for masters' theses and doctoral dissertations will naturally arise.

For the year 1926-1927 the following fields are offered:

Problems in Recent American History. Mr. Knight.
Problems in Constitutional History. Mr. Hockett.
Problems in Social History. Mr. Cole.
Problems in Ohio History. Mr. Wittke.
Problems in Latin-American Relations. Mr. Hill.

806-807-808. Seminary in European History. Three credit hours. Autumn, Winter, Spring Quarters. This course must be preceded or accompanied by History 601. Mr. Siebert, Mr. McNeal, Mr. Washburne, Mr. Noyes, Mr. Clyde.

A practice course in research in European History, otherwise similar to History 802-808-804.

For the year 1926-1927 the following fields are offered:

Problems in the Renaissance and Reformation, or Constitutional History of England. Mr. Siebert.
Problems in Medieval History, or the French Revolution. Mr. McNeal.
Problems in Expansion of Europe. Mr. Washburne.
Problems in English History (other than constitutional). Mr. Noyes.
Problems in the Far East. Mr. Clyde.
Problems in Greek and Roman History. Mr. _____.

HISTORY OF EDUCATION

Office, Education Building

PROFESSOR ANDERSON, MR. ECKELBERRY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: An acceptable course in the history of education.

601. Educational Classics. Four credit hours. Autumn Quarter. Four lectures each week. Mr. .....

Readings in Plato, Aristotle, Plutarch, Quintilian, Montaigne.

This course is not open to students who have credit for History of Education 350 or 351.

602. Educational Classics. Four credit hours. Spring Quarter. Four lectures each week. Mr. .....

Readings in Comenius, Locke, Rousseau, Pestalozzi, Herbart, Froebel.

605. History of Education in the United States. Two credit hours. Winter Quarter. Two lectures each week. Mr. Anderson.

606. History of Education in the United States. Two credit hours. Spring Quarter. Two lectures each week. Mr. .....

607. History of Industrial Education. Two credit hours. Winter Quarter. Two lectures each week. Mr. Anderson.

***608. History of the American High School.** Two credit hours. Spring Quarter. Two lectures each week. Mr. Eckelberry.

An historical and comparative study of the American high school.

***609. Present-Day Problems in Education, I.** Two credit hours. Spring Quarter. Two lectures each week. Open to Juniors, Seniors, and graduate students. Mr. .....

A review in the light of their history of the most noteworthy of recent attempts to solve the most urgent problems in elementary and secondary school education.

610. Present-Day Problems in Education, II. Two credit hours. Spring Quarter. Two lectures each week.

An historical study of attempts at a solution of the more urgent educational problems of today. A continuation of History of Education 609.

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* Not given in 1926-1927.

611. The History of Education in Ohio. Two credit hours. Spring Quarter. Mr. Eckelberry.

A study of the development of elementary, secondary, and higher education in Ohio as related to the political, social, and economic development of the state.

613. Comparative Education. Two credit hours. Autumn Quarter. Two lectures each week. Mr. Anderson.

A survey with historical introduction of existing systems of elementary and secondary education in Denmark, Germany, and two or three of the United States.

This course is not open to students who have credit for History of Education 603.

614. Comparative Education. Two credit hours. Spring Quarter. Two lectures each week. Mr. .....

A survey, with historical introduction, of existing systems of education in England and France.

This course is not open to students who have credit for History of Education 604.

†615. History of Method. Two credit hours. Four meetings each week. Mr. Anderson.

A survey of the development of the principles of method together with a review of the more noteworthy applications of these in instruction and training in some of the more fundamental subjects of the elementary and secondary school curriculum.

FOR GRADUATES

Prerequisite for Graduate Work: Students must have work in education amounting to at least eighteen hours in order to take graduate work in this department. A reading knowledge of German, French, Latin, or Greek is highly desirable.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802. Seminary in the History of Education. Two to five credit hours. Autumn and Spring Quarters. Required of all students majoring in the history of education. Mr. Anderson, Mr. .....

***805. A Survey of Source Material and of General Literature in the Field of the History of Education Among the Ancient Greeks.** Two credit hours. Winter Quarter. Two lectures or conferences each week. Mr. Anderson.

***806. A Survey of Source Material and of General Literature in the Field of History of Education in Western Europe during the Roman and Medieval Periods.** Two credit hours. Winter Quarter. Two lectures or conferences each week. Mr. Anderson.

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* Not given in 1926-1927.

† Not given during the academic year, 1926-1927.

807. A Survey of Source Material and of General Literature in the History of Education from the Beginning of the Italian Renaissance to the Middle of the Eighteenth Century. Two credit hours. Autumn Quarter. Two lectures or conferences each week. Mr. Anderson.

***808. A Survey of Source Material and of General Literature in the History of Education from the Middle of the Eighteenth Century.** Two credit hours. Summer Quarter. Two lectures or conferences each week. Mr. Anderson.

809-810-811. Research in the History of Education. Three to five credit hours. Autumn, Winter, Spring Quarters. Prerequisite, at least two hours in History of Education 801, 802, 803, 804. Mr. Anderson, Mr. .....

HOME ECONOMICS

Office, 220 Campbell Hall

PROFESSORS LANMAN, ADAMS, AND WALKER, ASSISTANT PROFESSORS FINDLAY, McKAY, AND DONNELLY, MISS STEIGER, MISS BANCROFT, MISS PECKHAM

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in home economics in addition to any prerequisites stated in the description of the courses. Course 611 requires also fundamental courses in physiology and agricultural chemistry; 621 and 641 require also a course in psychology.

609. Dietaries. One credit hour. Autumn Quarter. Not open to Freshmen or Sophomores. Not open to students majoring in Home Economics. This course is to be scheduled with Economics 644 as an organic part of the course. Miss McKay.

Minimum essentials of an adequate diet are considered. Applications are made to food problems of social case work.

611. Nutrition. Five credit hours. One Quarter. Autumn, Winter, Spring. Three lectures and two two-hour laboratory periods each week. Miss McKay, Miss Peckham.

A study of the fundamental principles of human nutrition and their application to the feeding of individuals and groups under varying physiological and economic conditions.

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* Not given in 1926-1927.

612. Advanced Nutrition. Five credit hours. Spring Quarter. Three two-hour periods each week for lecture and laboratory; other hours to be arranged. Prerequisite, Home Economics 611. Miss McKay.

A continuation of Home Economics 611. A study of current literature on nutrition. Problems of feeding in connection with overweight, underweight, rickets, diabetes, and other abnormal conditions are discussed.

613. Field Work in Nutrition. Five credit hours. Autumn, Winter, and Spring Quarters. One conference each week; other hours to be arranged. Elective. Prerequisite, Home Economics 611 and consent of instructor. Miss McKay.

An application of principles of nutrition to social and educational problems in schools, clinics, dispensaries, and homes.

614. Foods. Five credit hours. One Quarter. Autumn and Winter. Two lectures and three two-hour laboratory periods each week. Prerequisites, Home Economics 611 and an acceptable course in the principles of economics. Miss McKay, Miss Peckham.

A study of foods with reference to purchasing, planning of menus, and preparation of meals for groups of various income levels.

This course is not open to students who have credit for Home Economics 413.

615. Experimental Work in Food Preparation. Five credit hours. Winter Quarter. Three three-hour periods each week for lecture and laboratory. Prerequisite, Home Economics 611. Miss Steiger.

An application of scientific principles to problems involved in food preparation.

617. Household Management. Five credit hours. One Quarter. Autumn, Winter, Spring. Four lectures each week and laboratory to be arranged. Prerequisites, Home Economics 611 and economics. Mrs. Walker.

A study of the organization and management of the household with a view to securing the maximum of family welfare. Time is given to a consideration of the problems of expenditure through a study of relative values, examination of budgets, and discussion of factors influencing choice.

The Home Economics apartment and house where the students live in groups for a period of time, afford opportunity for experience.

618. The Purchase of Clothing and Household Furnishing. Five credit hours. Autumn Quarter. Three conferences each week; other hours to be arranged. Mrs. Walker.

This course deals with social and economic factors involved in the purchase of clothing and household furnishings. Field work is arranged with wholesale and retail merchants.

621. Child Care. Five credit hours. One Quarter. Autumn, Winter, Spring. Four lectures each week; laboratory to be arranged. Pre-

requisite or concurrent, Home Economics 611 and 617, and sociology. Miss Lanman.

The nature, development, care and training of the child, and the responsibility of society for providing for the physical, mental, and social needs of the child. The Home Economics Nursery School affords an opportunity for experience in dealing with problems of child care and management.

630. The Purchase of Foods for Institutions. Five credit hours. Autumn Quarter. Four lectures each week; other hours to be arranged. Prerequisites, Home Economics 611 and an acceptable course in the principles of economics. Prerequisite or concurrent, Home Economics 614 or consent of the instructor. Miss Findley.

A study of foods with reference to buying for institutions.

631. Institution Management. Five credit hours. One Quarter. Autumn and Winter. Credit will not be given until the following course, Home Economics 632, has been completed. Two lectures and two three-hour laboratory periods each week; other hours to be arranged. Prerequisites, Home Economics 611 and 630; prerequisite or concurrent, Home Economics 617. Miss Findley.

This course considers the organization, administration, equipment, and accounting in various types of institutions and the buying, preparation, and serving of food in large quantities. The Home Economics Cafeteria, the Faculty Club, Ohio Union Cafeteria, and Pomerene Hall Refectory are used as laboratories. Observations are made in restaurants, tea rooms, hotels, schools, and hospitals.

632. Institution Management. Five credit hours. One Quarter. Winter and Spring. Two three-hour periods each week for lecture and laboratory; other hours to be arranged. Prerequisites, Home Economics 631 and consent of the instructor; prerequisite or concurrent, Accounting 606 and an acceptable course in the selection and cutting of meat. Miss Findley.

This course is a continuation of Home Economics 631.

633. School Lunchroom Management. Three credit hours. Spring Quarter. One lecture and two two-hour laboratory periods each week. Prerequisite or concurrent, Home Economics 611 and 641. Miss Findley.

This course is arranged for those who wish to be prepared to manage school lunchrooms in connection with their teaching. It consists of a survey of equipment, organization, and management, with observations and practice in city and rural school lunchrooms.

641. Home Economics Teaching. Five credit hours. One Quarter. Autumn, Winter, Spring. Three lectures each week throughout the Quarter; observations to be arranged. Prerequisite, thirty-five Quarter-credit hours in required courses in Home Economics. Mrs. Adams, Miss Donnelly.

This course is given as preparation for supervised teaching in home economics. It includes a brief history of home economics instruction and its development to cope

with present-day needs. The course is developed with lectures and class discussions on the organization of home economics courses for various types of schools, planning of lessons; equipment of laboratories; classroom management and organization of home-project work. Vocational education is emphasized. Observation trips are scheduled and practice given in demonstration lessons.

642. Supervised Home Economics Teaching. Five credit hours. One Quarter. Autumn, Winter, Spring. Three lectures each week throughout the Quarter; other hours to be arranged. Time schedules for the Quarter must be approved by those in charge of the course. Prerequisite, Home Economics 641. Mrs. Adams, Miss Bancroft, and critic teachers.

This course gives an opportunity to teach classes in a city high school, rural and village schools, evening schools, and settlements. Each student makes observations and reports and is required to teach approximately thirty class exercises. This course gives special preparation for certification to teach Home Economics under the Smith-Hughes law and for the Special Provisional and High School State Certificate.

701. Special Problems in Home Economics. Three to fifteen credit hours for one Quarter or more. To be given in units of three or five hours. Autumn, Winter, Spring Quarters. One conference or more each week. Prerequisite, twenty-five Quarter-credit hours in the required courses in Home Economics and consent of the instructor. Miss Lanman, Mrs. Walker, Mrs. Adams, Miss McKay.

Reading and reports on home economics topics. Problems chosen for individual study.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Advanced Special Problems in Home Economics. Three to fifteen credit hours for one Quarter or more. To be given in units of three to five hours. Autumn, Winter, Spring Quarters. Miss Lanman, Mrs. Adams, Mrs. Walker, Miss McKay, Miss Donnelly, Miss Findley.

Investigational work bearing upon the problems of living, either in the home, the institution or under commercial conditions.

HORTICULTURE AND FORESTRY

Office, 118 Horticulture and Forestry Building

PROFESSORS PADDOCK, MONTGOMERY, AND HOTTES, ASSISTANT PROFESSOR SCHERER, MR. CHARLES

Prerequisite for All Courses in This Department: In general, the prerequisites for the "600" courses in pomology, vegetable gardening, floriculture, and farm woodlot are fundamental courses in these subjects and the permission of the instructor, in addition to any prerequisites stated in the description of the courses.

POMOLOGY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

601. Horticultural Plant Breeding. Three credit hours. Winter Quarter. Three lectures each week. Mr. Charles.

A study of the methods of breeding of horticultural crops; the modification and improvement of plants under cultivation, together with a discussion of the theories of heredity.

602. Experimental Horticulture. Three credit hours. Autumn Quarter. One lecture each week. Theses work arranged. Mr. Paddock.

The methods of experimentation and research. The limitations of demonstration and research are pointed out and the functions of the experiment station are emphasized. Recorded experiments are studied and criticized and special problems for experimentation are planned. Technical problems are assigned, which are to be presented as theses. This work not only gives practice in the application of exact methods, but affords opportunity to become familiar with the literature as well.

603. Experimental Horticulture. Three credit hours. Winter Quarter. One lecture each week. Theses work arranged. Prerequisite, Horticulture 602, and the two courses must be taken consecutively. Mr. Paddock.

This course is a continuation of Horticulture 602.

604. Systematic Pomology. Five credit hours. Autumn Quarter. Four lectures and one two-hour laboratory period each week. Mr. Paddock.

Nomenclature, classification, and identification of fruits; detailed descriptions, botanical relationships, adaptations, and commercial value of the commercial orchard fruits of the region.

605. The Literature of Horticulture. Five credit hours. Winter Quarter. Four lectures and one two-hour laboratory period each week. Mr. Paddock.

A study of the literature of horticulture.

606. Advanced Pomology. Five credit hours. Spring Quarter. Four lectures and one two-hour laboratory period each week. Mr. Paddock.

An interpretation of pomological practice in terms of recent investigations.

701. Minor Investigations. Three to fifteen credit hours, taken in units of three or five hours each Quarter for one or more Quarters. Autumn, Winter, Spring Quarters. All instructors.

This course is for students who desire to work out special problems in the fields of pomology, vegetable gardening or floriculture. Students will elect work in their desired subjects after a conference with the instructor in charge.

VEGETABLE GARDENING

FOR ADVANCED UNDERGRADUATES AND GRADUATES

*621. **Systematic Vegetable Gardening.** Five credit hours. Autumn Quarter. Three lectures and two two-hour laboratory periods each week. Mr. Montgomery.

A systematic study of the botany, origin, and history of the principal vegetable forms and varieties, including their description, identification, and special characteristics as regards table and market quality, adaptation to soils, and resistance to diseases.

FARM WOODLOT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

651. **Minor Investigations in Forestry.** Three or five credit hours for one or more Quarters. Autumn, Winter, Spring. Mr. Scherer.

An opportunity is given the student to make a special study of any phase of forestry.

FOR GRADUATES

Prerequisite for Graduate Work: Candidates must hold the degree of Bachelor of Science in Horticulture or its equivalent.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. **Research.** Five to ten credit hours. Autumn, Winter, Spring Quarters. Graduate students may do investigational work in some phase of the following subjects: pomology, horticulture, plant breeding, and floriculture. Mr. Paddock, Mr. Montgomery, Mr. Hottes.

INDUSTRIAL EDUCATION

Office, 212 Industrial Engineering Building

PROFESSOR USRY, ASSISTANT PROFESSORS SMITH AND WARNER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for Advanced Work in This Department: Acceptable courses in the field of education.

602. **Drawing and Project Design for Advanced Students in Industrial Education.** Three credit hours. Spring Quarter. One lecture and two three-hour laboratory periods each week. Prerequisite, an acceptable course in advanced project design, or equivalent. Mr. Warner.

The investigation, drawing, and design of special equipment and projects involving different materials that are used in the development of general and unit shops.

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* Not given in 1926-1927.

603. Planning and Equipping the Unit and General Shop. Two credit hours. Spring Quarter. One lecture and one three-hour laboratory period each week. Prerequisite, an acceptable course in installation and maintenance of school shop equipment, or equivalent. Mr. Smith.

Planning the relationship of machines, benches, tools, and storage rooms in the designing of the unit and general school shop. Computing the cost of equipment; other problems involved in shop planning and estimating.

610. Occupational Studies in the Junior and Senior High School. Three credit hours. Spring Quarter. Lectures, readings, and discussions. Prerequisites, acceptable courses in elementary woodwork, woodturning, and patternmaking; or advanced cabinet making, and the teaching of industrial education; or equivalent. Mr. Smith.

Designed especially for persons expecting to teach courses called "Occupations" in junior and senior high schools. A study of significant occupations, their characteristics, opportunities, and extent. Occupational information will be investigated, organized, and evaluated. Attention will be given to the development of a technique for gathering relevant material and conducting group conferences.

620. Organization and Supervision of Manual and Industrial Arts in the Junior High School. Three credit hours. Winter Quarter. Three lecture periods each week. Prerequisites, acceptable courses in the teaching of industrial education, materials and methods, and installation and maintenance of school shop equipment, or permission of the instructor. Mr. Warner.

Studies pertaining to organization and supervision. History, terminology, and objectives of junior high school industrial arts. Relation of manual and industrial arts to the general curriculum. Development of a shop and supervision program. Scope of junior high school drawing. Courses of study, curriculum building, shop layouts, and qualifications of teachers.

621. Organization and Supervision of Manual and Industrial Arts in the Senior High School. Three credit hours. Autumn Quarter. Three lecture periods each week. Prerequisites, acceptable courses in the teaching of industrial education, materials and methods, and installation and maintenance of school shop equipment, or permission of the instructor. Mr. Usry.

Objectives, equipment, courses of study in shopwork and drawing, correlation with other subjects, shop record forms, the shop organization, production methods in school shops, and the improvement of instruction and teachers in service.

626. Introduction to Industrial Education for Students of Education. Two credit hours. One Quarter. Autumn, Winter, Spring. Two lecture periods each week. Mr. Usry, Mr. Warner.

A course designed primarily for administrators. Readings and discussions relative to legislation and progress in the field of industrial education, organization from the administrator's viewpoint, teachers, relative costs, provision in building plans for shops.

650. Minor Problems in Industrial Education. One or more credit hours. Autumn, Winter, Spring Quarters. Prerequisite, twenty-five hours in industrial education and the consent of the department. All instructors.

Investigation of minor problems in the field of industrial education.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Seminary in Industrial Education. Two credit hours. Any Quarter. All instructors.

804. Major Research Problems in Industrial Education. Three or more credit hours. Any Quarter. All instructors.

Primarily intended for students offering theses for advanced degrees.

INDUSTRIAL ENGINEERING

Office, 119 Industrial Engineering Building

PROFESSORS YOUNGER AND W. A. KNIGHT, MR. BEEM, MR. FOUST, MR. DENMAN, MR. WRIGHT, MR. SCHNEIDER, MR. RICKLY, MR. JANNING

FOR ADVANCED UNDERGRADUATES AND GRADUATES

601. Engineering Organization. Four credit hours. Autumn Quarter. Four recitations each week. Prerequisites, acceptable courses in machine drawing, analytic geometry, mechanics and heat to conduction and elementary machine work. Mr. Younger.

The development of engineering organizations and a study of existing organizations. The differences in the functions of the jobbing and production shops. The coordination and relation of design engineering, research engineering, metallurgical engineering, production engineering, maintenance engineering, tool engineering, and safety engineering, all included under the title of Industrial Engineering.

603. Work Analysis. Three credit hours. Spring Quarter. Three recitations each week. Prerequisites, Industrial Engineering 601 and 623. Mr. Younger.

The analysis of operations used in the manufacture of different engineering products and of work in general. The importance of using proper speeds and feeds in machining and fabrication. Work analysis as a basis for estimating in the choice of materials and in the simplification of design for production.

623. Advanced Machine Work. Three credit hours. One Quarter. Autumn, Winter, Spring. One recitation and six laboratory hours each

week. Prerequisites, acceptable courses in elementary machine work, and advanced machine work. Mr. Knight, Mr. Wright, Mr. Rickly.

A course that gives practice corresponding to that of the tool and maintenance division of commercial shops. Tools, jigs, fixtures, development work, and repairs furnish the necessary exercises.

This course is not open to students who have credit for Shopwork 523.

639. Practical Experience in an Industrial Organization. Six credit hours. Ten weeks during the twelfth Quarter and before beginning the work of the fourth year. Prerequisite, Industrial Engineering 603. Mr. Younger.

To be obtained in some engineering or industrial organization. The student shall present a satisfactory report upon the work done. This report shall include a discussion of the industrial engineering aspects of the work done in the organization with which he was connected, with notes on the systems, methods, and processes of manufacture, and other observed data worthy of record. The occupation, the work done, and the report shall be subject to approval. If a student has had twelve months or more of satisfactory practical experience, he may be permitted to substitute a report upon the work so done for the above requirements. In case a student is unable to obtain an opportunity to gain such practical experience as will fulfill the above requirements, he may be permitted to substitute ten credit hours of approved Quarter courses for the same.

653. Work-Analysis Laboratory. Two credit hours. Spring Quarter. One recitation and four laboratory hours each week. Concurrent, Industrial Engineering 603. Mr. Younger.

Practice in the determination and setting of speeds and feeds and times on engineering work in the machine, foundry, and forge shops, with the tabulation and analysis of results.

701. Selection of Manufacturing Equipment. Three credit hours. Autumn Quarter. Three recitations each week. Prerequisite, Industrial Engineering 603. Mr. Younger.

The selection of manufacturing equipment. Specialized machines versus standard machines. The growing use of semi-automatic and full-automatic machine tools. Study of the product as regards machine tool to be used and the possibility of combining operations in one machine.

702. Work Routing. Four credit hours. Winter Quarter. Four recitations each week. Prerequisites, Industrial Engineering 701 and 751. Mr. Younger.

The engineering problems involved in the proper sequence in manufacturing operations. Types of plants to secure the best arrangements of equipment and processing. Handling and supervising the product at and between machines.

703. Standardization and Simplification. Three credit hours. Spring Quarter. Three recitations each week. Prerequisites, Industrial Engineering 752 and 702. Mr. Younger.

The importance of standards of design, of processing, of performance, of tools, and of equipment. The work of the national engineering societies, Government bureaus, and progressive plants in standardization and simplification.

705. Inspection and Waste Elimination. Two credit hours. Spring Quarter. Two recitations each week. Concurrent, Industrial Engineering 703. Mr. Younger.

The importance of quality of product. Methods of inspection. Methods of salvaging. A study of waste elimination by skillful selection. Utilization of by-products.

712. Principles of Industrial Engineering. Three credit hours. Winter Quarter. Three lectures each week. Prerequisite, completion of three years of the work of an engineering curriculum. Mr. Younger.

The development of engineering organizations. Jobbing and production shops. The coordination and organization of engineering functions. Work-analysis and routing. How to select mechanical equipment. Standardization, simplification, and waste elimination.

This course is not open to students who have credit for Mechanical Engineering 712.

713. Human Elements of Industrial Engineering. Three credit hours. Spring Quarter. Three lectures each week.

A series of lectures on the history of industrialism, art appreciation, personnel psychology, public health and sanitation and certain other subjects for engineering students who are about to graduate.

This course is not open to students who have credit for Mechanical Engineering 713.

751. Tools, Jigs, and Fixtures. Three credit hours. Autumn Quarter. One recitation and six hours of drawing-room practice each week. Prerequisites, Industrial Engineering 603 and 623. Mr. Knight.

A course in the design of tools, jigs, and fixtures. Attention given to the forms, life and efficiencies of cutting tools. The simple elements of jig design, such as different forms, locating points, clamping devices, and standardized parts, with drawing-room practice leading up to design of the more complicated fixtures.

752. Work-Routing Laboratory. Three credit hours. Winter Quarter. One recitation and two three-hour laboratory periods each week. Concurrent, Industrial Engineering 702. Mr. Younger.

Practice in the work of placing machine tools and laying out departments in their proper sequence for manufacturing specific products to best advantage. Visits to local plants to survey their methods in these respects.

753. Practice in Salvaging. Three credit hours. Spring Quarter. One lecture and six laboratory hours each week. Concurrent, Industrial Engineering 753. Mr. Younger.

A combined workshop and laboratory course dealing with the processes of salvaging and waste elimination. There will also be practical work in the processes of inspection.

754. Thesis. Three to six credit hours. Spring Quarter. One lecture and six to twelve laboratory hours each week. Mr. Younger, Mr. Knight.

ITALIAN

(See Romance Languages and Literatures)

JOURNALISM

Office, Journalism Building

PROFESSORS MYERS AND HOOPER, ASSISTANT PROFESSOR GETZLOE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in journalism in addition to any prerequisites stated in the description of the courses.

607. Newspaper Problems. Two credit hours. One Quarter. Autumn and Spring. One recitation and one laboratory period each week on the Lantern. Mr. Myers.

Consideration of the problems of newspaper work and direction, including advertising and circulation. Individual theses are required.

608. Newspaper Problems. Two credit hours. Winter Quarter. One recitation and one laboratory period each week on the Lantern. Prerequisite, Journalism 607. Mr. Myers, Mr. Getzloe.

This course is a continuation of Journalism 607.

621. Editorial Writing. Three credit hours. One Quarter. Autumn and Spring. Three recitations each week. Mr. Hooper.

Study of the purpose, form, style, and spirit of the editorial, as well as the responsibility of the writer to the newspaper, the community and the profession. Consideration of current events, practice in news interpretation and other editorial writing, and study of editorial pages.

622. Public Opinion in the Making. Three credit hours. Winter Quarter. Three recitations each week. Mr. Hooper.

Continuation of the study of the editorial, with special reference to leadership. Dramatic, music and literary criticism. Consideration of current events, and practice in editorial writing.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 716.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

802-803-804. The Newspaper as a Force in Human Progress. Two credit hours. Autumn, Winter, Spring Quarters. All instructors.

Lectures, individual research, and group discussions participated in by those investigating related subjects. A study of the newspaper in its relation to democracy, and of the outstanding figures in journalism.

808-809-810. Journalism Seminary. Two credit hours. Autumn, Winter, Spring Quarters. All instructors.

Instructors and students will meet regularly for the presentation and discussion of special problems in the newspaper field, each student making an intensive study of his own problem and writing a report on it.

LATIN LANGUAGE AND LITERATURE

(See Classical Languages and Literature)

MANUAL ARTS

(See Industrial Education)

MATHEMATICS

Offices, 314 and 317 University Hall

PROFESSORS BOHANNAN, McCOARD, KUHN, RASOR, C. C. MORRIS, ARNOLD, AND BLUMBERG, ASSISTANT PROFESSORS BAREIS, WEAVER, BEATTY, CARIS, RICKARD, BUMER, MacDUFFEE, AND WILDER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental course in calculus in addition to any prerequisites stated in the description of the courses. Course 601 requires also a course in physics; 698, a course in the mathematics of insurance.

601. Advanced Calculus. Five credit hours. Autumn Quarter. Five recitations each week. Mr. Wilder.

Selected topics from Osgood's Calculus.

***603. Advanced Calculus.** Five credit hours. Spring Quarter. Five recitations each week. Prerequisite, Mathematics 601 or 165. Mr. Bohannan.

Selected topics from Byerly's Integral Calculus and Wilson's Advanced Calculus.

* Not given in 1926-1927.

607. Introduction to the Theory of Functions of a Complex Variable. Five credit hours. Winter Quarter. Five recitations each week. Prerequisite, Mathematics 601. Mr. Rasor.

An introductory course in the theory of functions of a complex variable.

611. Differential Equations. Five credit hours. Winter Quarter. Five recitations each week. Mr. Bohannan.

612. Differential Equations. Five credit hours. Spring Quarter. Five recitations each week. Prerequisite, Mathematics 611 or 167. Mr. Bohannan.

†617. Introduction to Modern Mathematics. Five credit hours. Five recitations each week. Prerequisite, ten credit hours in mathematics beyond Mathematics 443, or permission of the instructor. Mr. Blumberg.

The principal aim of this course is not the imparting of comprehensive information but the initiation of the student, by means of lectures, collateral reading and problems, into various mathematical domains. The content will be selected from the following fields: Graphical and Numerical Methods, Projective Geometry, Theory of Numbers, the Mathematical Continuum, Mathematical Foundations, Point Sets, Groups, Probability, and Relativity.

621. Advanced Euclidian Geometry. Five credit hours. Winter Quarter. Five recitations each week. Mr. Weaver.

Geometric constructions; points lines and circles associated with a triangle; harmonic ranges and pencils; harmonic properties of the circle; radical axis; pole and polar with respect to a circle; inversion; symmedian points; Brocard points. This is chiefly a problem course in the field of plane geometry, and is of special value to teachers of the subject.

623. Projective Geometry. Five credit hours. Spring Quarter. Five recitations each week. Miss Bareis.

Projection and section, duality, cross ration, involution. Theorems of Desargues, Paschal and Brianchon, construction problems of the first and second degree.

625. Plane and Solid Analytic Geometry. Five credit hours. Autumn Quarter. Five recitations each week. Miss Bareis.

641. Elementary Theory of Equations. Five credit hours. Autumn Quarter. Five recitations each week. Mr. Kuhn.

Construction with ruler and compasses, numerical equations, determinants, symmetric functions. Text: Dickson's First Course in the Theory of Equations.

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† Not given during the academic year, 1926-1927.

*643. **Theory of Numbers.** Five credit hours. Autumn Quarter. Five recitations each week. Prerequisite, Mathematics 641 or 173. Mr. Kuhn.

Elementary properties of integers and the theory of congruences with simple applications.

661. **Vector Analysis.** Five credit hours. Spring Quarter. Five recitations each week. Prerequisite, Mathematics 601 or 165. Mr. Bumer.

Vector and scalar algebra and geometry, differentiation and differential operators, applications to electrical theory and to mechanics, dynamics, and hydro-dynamics. Text: Coffin's Vector Analysis.

*671. **Introduction to the Theory of Relativity.** Five credit hours. Spring Quarter. Five recitations each week. Prerequisite, Mathematics 661.

This course will be prefaced by a brief review of those parts of the classical theories of dynamics and physics which are necessary to an understanding of the special theory of relativity, its applications, and the elementary aspects of the general theory of relativity.

684. **Materials and Concepts of Elementary Mathematics.** Five credit hours. Winter Quarter. Five recitations each week. Mr. Arnold.

A critical review of the selection of the materials of secondary mathematics—the history of the development of this material and its underlying concepts. Systems of axioms for algebra; for geometry; the axiom of parallels. The Non-Euclidian Geometries. Construction with rules and compass. Variables, limits, number, infinity, transcendence.

*685. **The History of Mathematics.** Five credit hours. Spring Quarter. Five recitations each week. Mr. Arnold.

A survey of the development of elementary and secondary mathematics in ancient, medieval, and modern times, including a sketch of the history and teaching of mathematics in the United States.

691. **Probability.** Five credit hours. Autumn Quarter. Five recitations each week. Mr. Morris.

The first half of the course will be devoted to the development of the theory of probability from the standpoint of permutations, combination, choice and chance; the second half to a formal development of the subject as given by Coolidge in "Introduction to Probability."

692. **Finite Differences.** Five credit hours. Winter Quarter. Five recitations each week. Prerequisite, calculus. Mr. Bumer.

An introduction to finite differences; development of the more important methods of interpolation and summation.

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* Not given in 1926-1927.

693. **Actuarial Theory.** Five credit hours. Spring Quarter. Five recitations each week. Prerequisites, Mathematics 691 or 181 and 692. Mr. Bumer.

Life contingencies; actuarial principles of fire and accident insurance; workmen's compensation, and pension systems.

694. **Advanced Actuarial Theory.** Five credit hours. Autumn Quarter. Five recitations each week. Prerequisite, Mathematics 693 or 183-184. Mr. Bumer.

Construction of mortality and rate tables, policy values and dividend sheets.

696. **Mathematical Statistics.** Five credit hours. Winter Quarter. Five recitations each week. Prerequisite, Mathematics 691. Mr. Morris.

Derivation of statistical formulas by use of the theory of probability; least squares and their application to observational equations; curve filling.

697. **Statistical Methods of Forecasting.** Five credit hours. Spring Quarter. Five recitations each week. Prerequisite, Mathematics 696. Mr. Morris.

The application of the theory of probability to forecasting; weighing of biometric series by least squares; seasonal variations; curves of trend.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 735.

FOR GRADUATES

Prerequisite for Graduate Work: As a qualification for the study of mathematics as a graduate "major" the student must have completed previously the equivalent of at least two years of college mathematics, including calculus.

It is recommended that students intending to specialize in mathematics, acquire, as soon as possible, a reading knowledge of French, German, and Italian.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

NOTE: Students should consult with instructors before registering for courses open only to graduates.

800. **Seminary in Mathematics.** Three to five credit hours. Autumn, Winter, Spring Quarters.

This course consists of conferences, assigned readings, and reports for minor investigations.

801. **Reading and Research.** Three to ten credit hours each Quarter. Autumn, Winter, Spring Quarters. Library work and conferences. Prerequisite, the permission of the department.

805. Functions of a Real Variable. Five credit hours. Spring Quarter. Five recitations each week. Prerequisite, Mathematics 601 or 165. Mr. Blumberg.

Limits, the nature of numbers, point-sets, functional relations, infinite series and continuity, differentiability of functions, with applications.

806. Theory of Functions of a Complex Variable. Five credit hours. Spring Quarter. Five recitations each week. Mr. Rasor.

The algebra and calculus of complex numbers with their corresponding geometric representation; conformal representation; theory of power series; definition and properties of analytic functions; introduction to the theory of functions as developed by Cauchy, Riemann, and Weierstrass.

810. Foundations of Analysis Situs. Five credit hours. Autumn Quarter. Five recitations each week. Prerequisite, the permission of the instructor. Mr. Wilder.

A development of the foundations of plane analysis situs from a set of axioms, with a study of certain types of curves.

812. Point-Sets. Five credit hours. Winter Quarter. Five recitations each week. Prerequisite, the permission of the instructor. Mr. Wilder.

A study of the properties of various kinds of point-sets in any number of dimensions.

***816. Calculus of Variations.** Five credit hours. Spring Quarter. Five recitations each week. Mr. Bohannan.

***822. Non-Euclidian Geometry.** Five credit hours. Autumn Quarter. Five recitations each week. Mr. Weaver.

The geometry of Lobatschefskij and other allied geometries.

827. Differential Geometry. Five credit hours. Spring Quarter. Five lectures or recitations each week. Prerequisite, Mathematics 625. Mr. Weaver.

***841. Finite Groups.** Five credit hours. Spring Quarter. Five recitations each week. Mr. Kuhn.

Substitution groups, abstract groups, finite linear and collineation groups. Text: Miller, Blichfeldt, and Dickson's Theory and Applications of Finite Groups.

851. Introduction to Higher Algebra. Five credit hours. Autumn Quarter. Five lectures or recitations each week.

An introduction to the various branches of modern higher algebra and their relations to geometry, based on Bocher's text.

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* Not given in 1926-1927.

852. Algebraic Invariants. Five credit hours. Winter Quarter. Five lectures or recitations each week. Prerequisite, Mathematics 851 or equivalent.

A study of the invariants of algebraic forms and systems of forms both in one set of variables and in cogredient sets. Dickson's text will be used during part of the course.

853. Differential Invariants. Five credit hours. Spring Quarter. Five lectures or recitations each week. Prerequisites, Mathematics 601 and 852 or equivalent.

A course in the theory of invariants of differential forms with applications to differential geometry, and a brief introduction to tensor analysis and the theory of relativity.

***854. Continuous Groups.** Five credit hours. Autumn Quarter. Five lectures or recitations each week. Prerequisite, Mathematics 611. Mr. MacDuffee.

An introduction to the Lie theory of one-parameter groups, with applications to the solution of differential equations. Cohen's text will be used.

***855. Algebraic Numbers.** Five credit hours. Winter Quarter. Five lectures each week. Prerequisite, Mathematics 643. Mr. MacDuffee.

A study of the arithmetic theory of algebraic numbers and ideals.

***856. Hypercomplex Numbers.** Five credit hours. Spring Quarter. Five lectures each week. Prerequisite, Mathematics 855. Mr. MacDuffee.

A study of linear algebras and their arithmetics, with particular attention to Dickson's new theory of hypercomplex integers.

861. Fourier's Series and Spherical Harmonics. Five credit hours. Autumn Quarter. Five recitations each week. Prerequisites, Mathematics 601 or 165 and physics. Mr. Bohannan.

The solution of certain partial differential equations of physics in terms of normal forms: Fourier's integrals; curvilinear coordinates.

***891. Mathematical Theory of Statistics.** Three credit hours. Spring Quarter. Three recitations each week. Prerequisite, Mathematics 691 or 181. Mr. Morris.

The application of the theory of probability to statistical problems; simple and restricted sampling; errors in statistical constants; partial correlation, etc.

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* Not given in 1926-1927.

MECHANICAL ENGINEERING

Office, 244 Robinson Laboratory

PROFESSORS MAGRUDER, MARQUIS, NORMAN, AND JUDD, ASSISTANT PROFESSORS A. I. BROWN, BUCHER, STINSON, AND JACKLIN, MR. MOFFAT, MR. BEITLER, MR. ROBERTS, MR. HARSHMAN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in mathematics, physics, and mechanics in addition to any prerequisites stated in the description of the courses.

605. Heating and Ventilating. Four credit hours. One Quarter. Winter and Spring. Four recitations each week. Prerequisite, Mechanical Engineering 608. Mr. Brown.

A descriptive and analytical study of the apparatus and machinery and of the layouts used in the heating and ventilating of buildings.

This course is not open to students who have credit for Mechanical Engineering 551 and 572.

607. Steam Engineering. Five credit hours. Autumn Quarter. Five recitations each week. Mr. Marquis, Mr. Bucher.

The beginning of a descriptive and analytical study of steam-generating and steam-using machinery and of the elementary thermo-dynamics as applied to such machinery and to refrigeration and air compression.

608. Steam Engineering. Five credit hours. Winter Quarter. Five recitations each week. Prerequisite, Mechanical Engineering 607. Mr. Marquis, Mr. Bucher.

The continuation of Mechanical Engineering 607.

609. Steam Engineering. Three credit hours. Spring Quarter. Three recitations each week. Prerequisite, Mechanical Engineering 608. Mr. Marquis, Mr. Bucher.

The continuation of Mechanical Engineering 608.

614. Mechanism. Four credit hours. Autumn Quarter. Four recitations each week. Mr. Stinson, Mr. Moffat.

A descriptive and analytical study of kinematics, mechanism, and mechanical movements.

616. Mechanism Drawing. Two credit hours. Winter Quarter. Two three-hour laboratory periods each week. Prerequisite, Mechanical Engineering 614. Mr. Stinson, Mr. Moffat.

Drawing-board practice in laying out mechanisms and mechanical movements.

625. Gas Engines and Producers. Three credit hours. Spring Quarter. Three recitations each week. Prerequisites, Mechanical Engineering 608 and 614. Mr. Magruder.

A study of gas and oil engines and gas producers as used for power purposes.

639. Practical Experience in a Mechanical Engineering Plant. Six credit hours. Ten weeks during the twelfth Quarter and before beginning the work of the fourth year. Prerequisites, Mechanical Engineering 605, 609, 625, and 665. Mr. Magruder.

To be obtained in a power plant, drawing office, or engineering works or office. This course is to cover a more advanced grade of work than Mechanical Engineering 439.

The student shall present a satisfactory report upon the work done. This report shall include a discussion of the student's observations on the human, industrial, and engineering aspects of the work with which he was connected, on the systems, methods, and processes of manufacture, and on other observed data worthy of record. The occupation, the work done, and the report shall be subject to approval. If a student has had twelve months, or more, of satisfactory practical experience of the desired character, he may be permitted to substitute a report upon the work so done for the above requirements.

664. Mechanical Engineering Laboratory. Three credit hours. Winter Quarter. One six-hour laboratory period each week. Prerequisite, Mechanical Engineering 607; concurrent, Mechanical Engineering 608 and Mechanics 602. Mr. Moffat, Mr. Beitler, Mr. Roberts.

The calibration of thermometers, pressure gauges, and other instruments; steam-engine indicator practice; operation of steam engines; tests of oils, lubricants, the materials of construction, and of steam engines.

665. Mechanical Engineering Laboratory. Three credit hours. Spring Quarter. One six-hour laboratory period each week. Prerequisites, Mechanical Engineering 608 and 664; concurrent, Mechanical Engineering 609 and Mechanics 603. Mr. Moffat, Mr. Harshman.

Valve setting, moisture determination in steam, gas calorimetry, measurements of the flow of water by means of orifices, nozzles, weirs, and venturimeters, and tests of steam engines.

This course is not open to students who have credit for Mechanical Engineering 664.

704-705. Automotive Engineering. Three credit hours. Winter and Spring Quarters. Three recitations each week. Prerequisites, Mechanical Engineering 625 and 779; concurrent, Mechanical Engineering 782-783. Mr. Jacklin.

A descriptive and analytical study of the automobile, its chassis and engine, and other automotive machinery.

707. Heating and Ventilating Design. Three credit hours. Spring Quarter. One recitation and six hours of practice in computing or drawing rooms, or the equivalent, each week. Prerequisite, Mechanical Engineering 605. Mr. Brown.

The design and preparation of plans and specifications for the various systems used in the heating and ventilating of buildings.

715. Air-Compressing and Refrigerating Machinery. Three credit hours. Autumn Quarter. Three recitations each week. Prerequisites, Mechanical Engineering 604 and Mechanics 603. Mr. Magruder.

A descriptive and analytical study of air-compressing and compressed-air-using machinery and appliances, of systems of refrigeration and their machinery.

727. Machine Design. Five credit hours. Autumn Quarter. Five recitations each week. Prerequisites, Mechanics 603, Mechanical Engineering 609 and 614. Mr. Norman.

A detailed course of study based upon mechanics and the materials of construction applied to the design and construction of machinery.

728. Machine Design. Five credit hours. Winter Quarter. Three recitations and two three-hour laboratory periods each week. Prerequisite, Mechanical Engineering 727. Mr. Norman, Mr. Stinson.

The continuation of Mechanical Engineering 727.

742. Hydraulic Machinery. Three credit hours. Autumn Quarter Three recitations each week. Prerequisites, Mechanics 603 and Mechanical Engineering 609. Mr. Judd, Mr. Beitler.

A study of pumping machinery.

744. Machine Design. Five credit hours. Spring Quarter. Three recitations and two three-hour laboratory periods each week. Prerequisite, Mechanical Engineering 728. Mr. Norman, Mr. Stinson.

The continuation of Mechanical Engineering 728.

746. Steam Turbines. Three credit hours. Winter Quarter. Three recitations each week. Prerequisites, Mechanical Engineering 609 and 779. Mr. Marquis.

A study of the generation of power by steam turbines, including auxiliary machinery.

747. Special Design. Three credit hours. Spring Quarter. Three recitations each week, or the equivalent in drawing-board work. Prerequisite, Mechanical Engineering 728; concurrent, Mechanical Engineering 744. Mr. Norman.

A special course in the design of some machine for advanced students desiring to specialize along this line.

748. Thesis Work. Three or more credit hours. Autumn, Winter, Spring Quarters. Two or more four-hour laboratory periods each week. Prerequisites, Mechanical Engineering 605, 609, 625, or 727. Mr. Magruder, Mr. Marquis, Mr. Norman, Mr. Judd, Mr. Brown.

An original and special investigation or design based upon the work of the courses.

754. Hydraulic Power. Three credit hours. Winter Quarter. Three recitations each week. Prerequisites, Mechanics 603 and Mechanical Engineering 779. Preliminary to Mechanical Engineering 785. Mr. Judd.

A study of the dynamics, generation, and economics of hydraulic power, including hydraulic turbines and their equipment.

779-780-781. Mechanical Engineering Laboratory. Three credit hours. Autumn, Winter, Spring Quarters. One six-hour laboratory period each week. Prerequisites, Mechanics 603 and Mechanical Engineering 609 and 665. Mr. Marquis, Mr. Judd, Mr. Brown, Mr. Bucher, Mr. Jacklin, Mr. Beitler.

Tests of steam engines; steam boilers; gas, oil and automotive engines; air compressors; injectors and pulsometers; centrifugal, rotary and power pumps; impulse and turbine water wheels; fans and blowers; steam turbines.

782-783. Automotive Engineering Laboratory. Three credit hours. Winter and Spring Quarters. One six-hour laboratory period each week. Optional with Mechanical Engineering 780-781. To be taken only by those students who elect Mechanical Engineering 704-705. Mr. Jacklin, Mr. Cobb.

Tests of automotive power-plants, fans, pumps, and of complete vehicles in the laboratory and on the road, together with heat-balance tests of gas and oil engines.

785. Hydraulic Power Laboratory. Three credit hours. Spring Quarter. One six-hour laboratory period each week. Optional with Mechanical Engineering 781. Prerequisite, Mechanical Engineering 754. Mr. Judd.

A laboratory study of the dynamics of jets, the flow and measurement of water, and the testing of impulse and reaction turbines.

793. Mechanical Engineering Laboratory. Three credit hours. Spring Quarter. One six-hour laboratory period each week. Prerequisite, Mechanical Engineering 780. Mr. Marquis, Mr. Judd, Mr. Brown, Mr. Jacklin.

An advanced course in special laboratory work to be arranged for groups of five or more students.

FOR GRADUATES

Prerequisite for Graduate Work: Graduate work in this department requires as general prerequisites, collegiate courses in mechanics, strength of materials, steam or gas engines, and a knowledge of the fundamentals of hydraulics.

For major work a candidate must hold a baccalaureate degree in Mechanical Engineering.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Research Work. Five to ten credit hours. Autumn, Winter, Spring Quarters. Library, conference, and laboratory work. Time to be arranged with the instructor. Prerequisite, the permission of the instructor in charge. Mr. Magruder, Mr. Marquis, Mr. Norman, Mr. Judd, Mr. Brown.

Research work in gas enginery and gas producers and materials of construction is under the supervision of Mr. Magruder; in steam engineering and fuel testing, under Mr. Marquis; in machine design, under Mr. Norman; in applied hydraulics and the flow of fluids, under Mr. Judd; in heating and ventilating, under Mr. Brown.

805-806-807. Gas Power and Design. Two to five credit hours. Autumn, Winter, Spring Quarters. Library, conference, and drawing-board work. Prerequisites, courses in gas engines, automotive engineering, thermodynamics, and machine design. Mr. Magruder.

811-812-813. Gas Power and Laboratory Work. Two to six credit hours. Autumn, Winter, Spring Quarters. One to three four-hour periods each week. Prerequisites, courses in gas engines, automotive engineering, thermodynamics, and machine design; concurrent, Mechanical Engineering 805-806-807. Mr. Magruder.

This course must be taken in groups of at least two and preferably three students.

815-816-817. Steam Power Plants, Economics, and Design. Three to five credit hours. Autumn, Winter, Spring Quarters. Library, conference and drawing-board work. Prerequisites, courses in power plants, steam engines, turbines, and boilers, and power-plant design. Mr. Marquis.

MECHANICS

Office, 225 Industrial Engineering Building

PROFESSORS BOYD AND CODDINGTON, ASSISTANT PROFESSOR OTT, MR. DEVINE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: An acceptable course in calculus in addition to any prerequisites stated in the description of the courses.

601. Statics. Five credit hours. One Quarter. Autumn, Winter, Spring. Five recitations each week. Mr. Boyd, Mr. Coddington, Mr. Ott, Mr. Devine.

602. Strength of Materials. Five credit hours. One Quarter. Autumn, Winter, Spring. Four recitations and one two-hour laboratory period each week. Prerequisite, Mechanics 601. Mr. Boyd, Mr. Ott, Mr. Devine,

603. Strength of Materials, Kinetics and Hydraulics. Five credit hours. One Quarter. Autumn, Winter, Spring. Five recitations each week. Prerequisite, Mechanics 602. Mr. Boyd, Mr. Coddington, Mr. Ott.

604. Strength of Materials. Three credit hours. Winter Quarter. Three recitations each week. Prerequisite, Mechanics 601. Mr. Devine.

FOR GRADUATES

Prerequisite for Graduate Work: Graduate work in this department requires as general prerequisites, collegiate courses in differential and integral calculus, differential equations, and a year of general physics.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Advanced Theoretical Mechanics. Three credit hours. Autumn Quarter. Three recitations each week. Prerequisites, Mechanics 602 and differential equations. Mr. Boyd, Mr. Ott.

802. Advanced Theoretical Mechanics. Three credit hours. Winter Quarter. Three recitations each week. Prerequisite, Mechanics 801. Mr. Boyd.

803. Advanced Theoretical Mechanics. Three credit hours. Spring Quarter. Three recitations each week. Prerequisite, Mechanics 802. Mr. Boyd.

METALLURGY

Office, 100 Lord Hall

PROFESSORS DEMOREST AND MUELLER, ASSISTANT PROFESSOR LORD

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Acceptable courses in physics and metallurgy in addition to any prerequisites stated in the description of the courses. Courses 610, 620, and 665 require also a course in descriptive mineralogy.

601. Fuels and Fuel Testing. Five credit hours. Autumn Quarter. Three lectures or recitations and two three-hour laboratory periods each week. Mr. Demorest, Mr. Lord.

Lectures, recitations, and problem work on solid, liquid, and gaseous fuels, their use, preparation, and efficiencies and the thermo-chemistry of combustion. Laboratory work on the analysis of fuels and determination of their heating values.

605. Iron and Steel Metallurgy. Three credit hours. Winter Quarter. Three lectures or recitations each week. Prerequisite, Metallurgy 651 or 601. Mr. Demorest, Mr. Lord.

Lectures and problem work on the production of iron and steel and the manufacture of iron and steel shapes.

606. Principles of Metallography. Two credit hours. Winter Quarter. One lecture or recitation and one three-hour laboratory period each week. Prerequisites, one year of college physics and one year of college chemistry. Mr. Lord.

Lectures and laboratory work on the structure and properties of metals. Equilibria of metals are studied by the aid of the microscope.

607. Inspection of Commercial Metals. Three credit hours. Spring Quarter. One lecture and two three-hour laboratory periods each week. Prerequisites, one year of college physics and chemistry. Mr. Lord.

The application of metallographic methods to the inspection of commercial metals for students not specializing in metallurgy.

610. Non-Ferrous Metallurgy. Five credit hours. Spring Quarter. Five recitations each week. Prerequisites, Metallurgy 601 and 605. Mr. Mueller.

Lectures, recitations, and problem work on the metallurgy and properties of non-ferrous metals, with special attention to the principles of igneous concentration of the precious metals and study of hydro-metallurgical and electro-metallurgical processes of the present day.

620. Principles of Ore Dressing. Five credit hours. One Quarter. Autumn and Winter. Three lectures or recitations and two three-hour laboratory periods each week. Mr. Mueller.

Lectures, recitations, and laboratory work on the principles of ore dressing, reclamation of minerals and metals, and coal washing.

650. Pyrometry. Two credit hours. Autumn Quarter. One lecture or recitation and one three-hour laboratory period each week. Mr. Demorest, Mr. Lord.

Lectures, laboratory, and problem work on the calibration and use of resistance, thermo-electric, optical, and total radiation pyrometers.

651. Fuels. Three credit hours. One Quarter. Autumn and Winter. Three lectures or recitations each week. Mr. Demorest, Mr. Mueller, Mr. Lord.

Lectures, recitations, and problem work on solid, liquid, and gaseous fuels, their use, preparation, and efficiencies and the thermo-chemistry of combustion.

652. Gas Testing and Calorimetry. One credit hour. Autumn Quarter. One three-hour laboratory period each week. Concurrent, Metallurgy 651. Mr. Demorest, Mr. Lord.

Laboratory work and problems on the analysis of flue and fuel gases.

655. Technical Gas and Fuel Analysis. Three credit hours. Winter Quarter. One lecture or recitation and two three-hour laboratory periods each week. Mr. Demorest, Mr. Lord.

Lecture, laboratory, and problem work on the analysis of coal, fuel, and flue gas, and mine gases and the determination of the heating values of solid, liquid, and gaseous fuels.

665. General Metallurgy. Five credit hours. Spring Quarter. Five lectures or recitations each week. Prerequisite, Metallurgy 601 or 651. Mr. Mueller, Mr. Lord.

Lectures, recitations, and problem work on the metallurgy of iron, steel, copper, lead, zinc, gold, silver, etc., including the principles of igneous, hydro-metallurgical and electro-metallurgical processes for recovery and refining of the common metals.

701. Advanced Metallography. Four credit hours. Autumn Quarter. Two lectures or recitations and two three-hour laboratory periods each week. Prerequisite, Metallurgy 605. Mr. Lord.

The microscopic examination and micro-photography of normal samples of irons, steels, brasses, with special attention to faults and sources of weakness.

702. Heat Treatment and Special Steels. Three credit hours. Winter Quarter. One lecture or recitation and two three-hour laboratory periods each week. Prerequisite, Metallurgy 701. Mr. Demorest, Mr. Lord.

Experiments in and microscopic study of normalizing, annealing, quenching, tempering, case-hardening, and working of steels with special attention to alloy steels.

705. Metallurgical Construction. Four credit hours. Winter Quarter. Two lectures or recitations and two three-hour laboratory periods each week. Prerequisites, Metallurgy 601 or 651, 605, 720, 610 or 655. Mr. Mueller.

Lectures, recitations, and drawing-room practice on the principles, practice, and design of concentrators and coal-washing plants.

706. Metallurgical Construction. Four credit hours. Spring Quarter. Two lectures or recitations and two three-hour laboratory periods each week. Prerequisite, Metallurgy 705. Mr. Demorest, Mr. Lord.

Option: Continuation of Metallurgy 705 with special reference to operation, control, costs, and handling of materials; or lectures, recitations, and drawing-room practice on the principles, practice, and design of metallurgical furnaces and plants with special reference to operation, control, costs, and handling of materials.

709. The Principles of Gas Engineering. Six credit hours. Winter Quarter. Three lectures or recitations and three three-hour laboratory periods each week. Prerequisites, Metallurgy 601 or 651 and Metallurgy 608. Mr. Demorest.

Lectures, problems and laboratory work on the technology and economics of manufactured gas production and distribution for industrial and public utility uses, and the manufacture of coke.

710. Metallurgical Investigations. Three or five credit hours. One Quarter. Autumn and Winter. One recitation or lecture and two or four three-hour laboratory periods each week. Prerequisites, Metallurgy 701, 720, 610, or 665. Mr. Demorest, Mr. Mueller.

The class is divided into groups for investigation along the lines of their special interests as follows:

(a) The Properties of Metals and Alloys.
(b) Production and Refining of Metals.
(c) Ore Dressing and Coal Washing.
(d) Manufactured Gas and Coal Distillation Processes.

All investigations are under close direction of instructors.

711. Metallurgical Investigations. Five credit hours. Spring Quarter. Two lectures or recitations and two three-hour laboratory periods each week. Prerequisite, Metallurgy 710. Mr. Demorest, Mr. Mueller.

A continuation of Metallurgy 710.

720. Ore Dressing. Three credit hours. Autumn Quarter. One lecture and two three-hour laboratory periods each week. Prerequisite, Metallurgy 620. Mr. Mueller.

Lectures and laboratory work in the design of flow sheets and concentration practice for ores, and leaching processes.

721. Coal Preparation. Three credit hours. Autumn Quarter. One lecture and two three-hour laboratory periods each week. Prerequisite, Metallurgy 620. Mr. Mueller.

Lectures and laboratory work in the beneficiation of coals for commercial uses and the design of flow sheets for coal cleaning operations.

725. Thesis. Five or six credit hours. Spring Quarter. Prerequisite, Metallurgy 710. Mr. Demorest, Mr. Mueller.

Each student is required to select a subject for investigation, with approval of instructor, and to develop methods of research for his subject and carry it to completion.

MINE ENGINEERING

Office, 219 Lord Hall

PROFESSOR NOLD, MR. O'ROURKE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Acceptable training in mine engineering in addition to any prerequisites stated in the description of the courses.

601. Prospecting and Preliminary Operations. Five credit hours. Spring Quarter. Five recitations each week. Mr. Nold, Mr. O'Rourke.

Prospecting, boring, use of explosives, shaft sinking, and tunneling.

701. Development and Methods of Mining. Three credit hours. Autumn Quarter. Three recitations each week. Prerequisite, Mine Engineering 601. **Mr. Nold.**

Development, location of openings, methods of mining, supporting excavations, etc.

702. Mine Operations. Five credit hours. Winter Quarter. Five recitations each week. Prerequisites, Mine Engineering 701, Electrical Engineering 630 and 635. Mr. Nold.

Drainage, haulage, hoisting, ventilation, illumination, mine gases, and explosions.

703. Mine Examinations and Reports. Five credit hours. Spring Quarter. Five lectures each week. Prerequisites, Mine Engineering 702 and Geology 605 or equivalent. Mr. Nold.

Mine examinations, estimation of ore reserves, valuation, reports, organization, administration and determination of costs.

711. Mine Design. Five credit hours. Winter Quarter. Three recitations and two three-hour laboratory periods each week. Concurrent, Mine Engineering 702. Mr. Nold, Mr. O'Rourke.

Design of mining plants. The student is given certain data relative to an actual or hypothetical mine, and he designs the plant lay-out and details a building.

712. Mine Design. Five credit hours. Spring Quarter. One recitation and three four-hour laboratory periods each week. Prerequisite, Mine Engineering 711. Mr. Nold, Mr. O'Rourke.

A continuation of the problem assigned in Mine Engineering 711. The design of mine structures and buildings. Specification writing and estimating of costs.

740. Thesis. Two credit hours. Winter Quarter. Mine Engineering, fourth year. Mr. Nold.

741. Thesis. Five credit hours. Spring Quarter. Mine Engineering, fourth year. Mr. Nold, Mr. O'Rourke.

This course is a continuation of Mine Engineering 740.

750. Mine Investigations. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Nold, Mr. O'Rourke.

(a) Study and Investigation of Some Phases of Mine Development and Operation.
(b) Study of Mine Ventilation and Laboratory Work with Ventilating Equipment.
(c) Study of the Engineering Problems of Petroleum and Natural Gas Exploration, Production, and Transportation.

751. Mine Investigations. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Prerequisite, Mine Engineering 750. Mr. Nold, Mr. O'Rourke.

A continuation of Mine Engineering 750.

760. Principles of Mining. Three credit hours. Autumn Quarter. Three recitations each week. Mr. Nold.

Recitations and lectures on the principles of prospecting and mining.

FOR GRADUATES

Prerequisite for Graduate Work: Students desiring to undertake advanced work in this department should have a thorough working knowledge of chemistry, physics, and mechanics.

For major work a candidate must hold a baccalaureate degree in Mine Engineering.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Mining Investigations. Three to five credit hours. Autumn, Winter, Spring Quarters. Prerequisite, the permission of the instructor in charge. Mr. Nold.

Library, conference, laboratory, and field work on some phase of mining or mine operations.

MINERALOGY

Office, 115 Lord Hall

PROFESSOR McCAUGHEY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in crystallography and mineralogy in addition to any prerequisites stated in the description of the courses. Course 611 requires a fundamental course in geology including elementary petrography, 621 a college course in physics covering light. Students following mineralogy and petrography as majors should have as prerequisites fundamental courses in geology, chemistry and physics.

601. Advanced Crystallography. Five credit hours. Spring Quarter. Mr. McCaughey.

Study of the thirty-two crystal groups and their representative minerals. Laboratory practice with the two circle gomometer in the measurement of crystals and in the drawing and projection of crystals.

605. Thermochemical Mineralogy. Three credit hours, Autumn Quarter. Four credit hours, Spring Quarter. Three or four lectures each week. Prerequisite, Chemistry 681-682-683. Mr. McCaughey.

Thermal properties of minerals, their formation and transformation in silicate mixtures.

606. Advanced Thermo-Chemical Mineralogy. Three credit hours. Winter Quarter. Three lectures each week. Prerequisite, Mineralogy 605. Mr. McCaughey.

Continuation of Mineralogy 605. Formation and solid solution of silicate minerals in multiple component systems.

611. Elementary Microscopic Petrography. Four credit hours. Spring Quarter. Two lectures and two two-hour laboratory periods each week. Mr. McCaughey.

Instruction and practice in the use of the petrographic microscope in the identification and study of minerals and rocks in thin section.

621. Microscopic Mineralogy. Five credit hours. Autumn Quarter. Two lectures and three two-hour laboratory periods each week. Mr. McCaughey.

The use of a polarizing microscope in the identification of minerals in fine powder and thin section. Determination of the optical constants of minerals and crystallized substances with the polarizing microscope.

631. Mineralogical Investigations. Five credit hours. Winter and Spring Quarters. Library, conference, and advanced laboratory work. Prerequisites, Mineralogy 621 or 611. Mr. McCaughey.

(a) **Microscopic Petrography.** Study and investigation of igneous, metamorphic, and sedimentary rocks in thin section.

(b) **Soil Mineralogy.** Mineralogical investigation of loose rock, such as soils, sand, and clays.

(c) **Applied Microscopic Mineralogy.** Application of the principles of microscopic mineralogy to the determination of melting and transformation temperature of minerals; microscopic study of refractories, ceramic products and glasses.

741. Thesis. Five or six credit hours. Spring Quarter. Prerequisite, senior standing in the curriculum leading to the degree of Ceramic, Mining, Chemical, or Metallurgical Engineering. Mr. McCaughey.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Research in Mineralogy and Petrography. Three to ten credit hours. Autumn, Winter, Spring Quarters. Library conference and laboratory.

MUSIC

Office, 323 Campbell Hall

PROFESSOR HUGHES

FOR ADVANCED UNDERGRADUATES AND GRADUATES

601. The Romanticists. Four credit hours. Autumn Quarter. Four lectures each week. Prerequisites, acceptable courses in the history and appreciation of music, and junior standing. Mr. Hughes.

The music of the romantic period in Germany and France.

602. The Opera. Four credit hours. Winter Quarter. Four lectures each week. Prerequisite, Music 601. Mr. Hughes.

Rise of romanticism in opera. Wagner and the culmination of the music drama.

603. Modern Music. Four credit hours. Spring Quarter. Four lectures each week. Prerequisite, Music 601. Mr. Hughes.

A brief survey of modern developments with special reference to the composers of France and Russia.

610. Advanced School Music Methods. Four credit hours. Autumn Quarter. Four recitations each week. Prerequisites, acceptable courses in school music methods, essentials of music, sight singing and dictation, and junior standing. Miss .....

Methods for junior and senior high schools. Testing of voices. Organization and drill of orchestras, glee clubs, etc.

611. Advanced School Music Methods. Four credit hours. Spring Quarter. Four recitations each week. Prerequisite, Music 610. Miss .....

Continuation of Music 610. The teaching of harmony, history, appreciation, etc., in the high school. Credit system for high school music. Review of the whole field of school music with special reference to the major problems of the supervisor.

620. Advanced Harmony. Three credit hours. Autumn Quarter. Three recitations each week. Prerequisites, acceptable courses in harmony, and junior standing. Miss .....

Study of modulation, non-harmonic tones and altered chords.

621. Advanced Harmony. Three credit hours. Winter Quarter. Three recitations each week. Prerequisite, Music 620. Miss .....

Continuation of Music 620.

PATHOLOGY

Office, Hamilton Hall

PROFESSORS SCOTT AND SPOHR, MR. VAN BUSKIRK, MR. REEL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Permission of the instructor in addition to any prerequisites stated in the description of the courses.

601. General Pathology. Three credit hours. Winter Quarter. One lecture and six laboratory hours each week. Prerequisite, Anatomy 624. Mr. Scott.

Pathology of inflammatory, regenerative, and retrogressive lesions.

602. Special Pathology. Five credit hours. Spring Quarter. Two lectures and nine laboratory hours each week. Prerequisite, Pathology 601. Mr. Scott.

Pathology of the special organs and tumors.

603. Clinical Pathology. Three credit hours. Autumn Quarter. One lecture and four laboratory hours each week. Mr. Spohr.

Pathology of the blood; complement fixation; anaphylaxis; vaccines; urine; feces; stomach contents; spinal fluid, and the various exudates.

604. Clinical Pathology. Three credit hours. Winter Quarter. One lecture and four laboratory hours each week. Mr. Spohr.

This course is a continuation of Pathology 603.

605. Surgical Pathology. Two credit hours. Spring Quarter. One lecture and two laboratory hours each week. Mr. Reel.

A course correlating the symptomatology with the operative specimens.

606. Medical Pathology. Two credit hours. Spring Quarter. One lecture and two laboratory hours each week. Mr. Van Buskirk.

A course correlating the symptomatology with the post-mortem pathology.

607. Post-Mortem Demonstration. One credit hour. One Quarter. Autumn, Winter, Spring. Mr. Scott, Mr. Van Buskirk.

608-609-610. Advanced Pathology. Three to five credit hours. Autumn, Winter, Spring Quarters. One lecture and four to six laboratory hours each week. Prerequisites, Pathology 601-602 and Bacteriology 641-642. Mr. Scott.

Autopsy and microscopical technique.

611-612-613. Advanced Special Pathology. Three to five credit hours. Autumn, Winter, Spring Quarters. One lecture and four or six laboratory hours each week. Prerequisites, Pathology 601-602 and Bacteriology 641-642. Mr. Scott, Mr. Reel.

Histology and experimental pathology of special organs and tissues.

614-615. Experimental Pathology. Three to five credit hours. Winter and Spring Quarters. One lecture and four or six laboratory hours each week. Prerequisites, Pathology 601-602 and Bacteriology 641-642. Mr. Spohr.

Experimental infections and immunity as applied to medicine.

616 617-618. Advanced Clinical Pathology. Three credit hours. Autumn, Winter, Spring Quarters. One lecture and four laboratory hours each week. Prerequisite, Pathology 603-604. Mr. Spohr.

Study of materials collected in the hospital wards and out-patient department

619-620-621. Neuropathology. One credit hour. Autumn, Winter, Spring Quarters. One lecture and two laboratory hours each week. Prerequisites, Pathology 601 and 602. Mr. Scott.

Including the gross and microscopic lesions of the nervous system.

PHILOSOPHY

Office, 109 University Hall

PROFESSORS LEIGHTON, SABINE, AND CHANDLER, ASSISTANT PROFESSOR AVEY, MR. REISER, MR. FARBER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: In addition to any prerequisites stated in the description of the courses the prerequisites for courses in this group are as follows: Course 601 requires an acceptable course in the introduction to philosophy or elementary ethics; 602, 605, 606, 610, 623, 625, 626, and 652 require an acceptable course in the introduction to philosophy; 603, acceptable courses in the introduction to philosophy and elementary ethics; 653 and 656, acceptable courses in the introduction to philosophy and elementary ethics, and the permission of the instructor; 661, acceptable courses in the introduction to philosophy and logic; 662, acceptable courses in the introduction to philosophy and logic, and the permission of the instructor.

Students are advised to consult with the instructor in reference to details concerning prerequisites.

Courses bearing numbers 601 to 650 are historical; courses bearing numbers 651 to 700 are systematic.

601. Ancient and Medieval Philosophy. Five credit hours. Autumn Quarter. Mr. Sabine.

A review of the most important contributions to philosophical thought from the dawn of history to the end of the Middle Ages. Most of the time is devoted to Greek philosophy.

A natural continuation of this course will be found in Philosophy 602.

602. Modern Philosophy. Five credit hours. Winter Quarter. Mr. Sabine.

A review of the most important contributions to philosophical thought from the Renaissance to the end of the nineteenth century.

A natural continuation of this course will be found in Philosophy 603.

603. Contemporary Philosophy. Five credit hours. Spring Quarter. Prerequisite, one of the following: Philosophy 601, 602, or 107, 108. Mr. Sabine.

An account and critical estimate of the chief formative influences in the reflective life of the present time. Intended for students of literature, science, and social movements, as well as for students desiring a continuation of Philosophy 601-602.

605. Origins of Our Moral Ideas. Five credit hours. Winter Quarter. Mr. Leighton.

A historical and critical consideration of the ideals of human life and ethical principles, both individual and social, contributed to our culture by ancient Greece, Christianity, modern science, and modern humanism. The object of the course is to arrive at a systematic evaluation of the valid factors in an ethical philosophy of life.

***606. American Philosophy.** Three credit hours. Winter Quarter.

A survey of the chief philosophical standpoints which have entered into the constitution of the American mind since colonial times; the life and works of the thinkers whose theories are considered.

608. Philosophy and Poetry. Three credit hours. Spring Quarter. Mr. Chandler.

A discussion of Lucretius, Dante's "Divine Comedy," and Goethe's "Faust," for the light they throw on the history of thought and the nature of poetic excellence.

610. Origins of Christian Thought. Three credit hours. Winter Quarter. Prerequisite, Philosophy 601 or 107, or 407 or 408. Mr. Avey.

A historical inquiry into the content and meaning of the psychological, ethical, and metaphysical teaching of the New Testament; followed by an inquiry into the development of Christian thought up to the formation of the Nicene Creed, with especial reference to the influence of Greek philosophy thereon.

623. Plato. Three credit hours. Winter Quarter. Prerequisite, three Quarters in philosophy, including Philosophy 601 or 107. Mr. Chandler.

Selected dialogues of Plato will be studied in Jowett's translation with reference to their permanent significance for philosophy, literature, and politics.

***624. Aristotle and Plotinus.** Three credit hours. Winter Quarter. Prerequisite, Philosophy 623. Mr. Chandler.

Selections from the writings of Aristotle and Plotinus will be studied with reference to their permanent significance for philosophy.

***625. Representative Pre-Kantian Philosophers.** Three credit hours. Spring Quarter. Prerequisite, Philosophy 602 or 108.

A few representative works of classic thinkers of the period from Bacon and Descartes to Kant will be selected for intensive study.

†**626. Representative Post-Kantian Philosophers.** Three credit hours. Prerequisite, Philosophy 602 or 108.

A few representative works of classic thinkers of the period from Kant to Spencer will be selected for intensive study.

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* Not given in 1926-1927.

† Not given during the academic year, 1926-1927.

627. Nineteenth Century Empiricists. Three credit hours. Autumn Quarter. Prerequisite, Philosophy 602. Mr. Reiser.

A study of John Stuart Mill and other positivists, and Herbert Spencer and other philosophical evolutionists.

652. Philosophy of Science. Three credit hours. Spring Quarter. Prerequisite, Philosophy 602 or 108; also three Quarters of college science. Mr. Reiser.

An examination of the fundamental motives, assumptions, and methods of the natural and social sciences, with consideration of their influence on philosophical theories.

653. Philosophy of Religion. Three credit hours. Spring Quarter. Prerequisite, one of the following: Philosophy 601, 602, 610, 656, 665, or 107, 108. Mr. Leighton.

The psychical and social nature of religion; the leading ideas of the great world-religions; a systematic examination of the fundamental religious conceptions—the idea of God in relation to the idea of the world, the idea of man, and the problem of human destiny.

656. Principles of Individual and Social Ethics. Five credit hours. Spring Quarter. Prerequisite, one of the following: Philosophy 601, 602. Mr. Leighton.

Systematic development of a philosophy of human values, and its application to the chief forms and activities of civilized life—industrial and economic activities, the state, education, culture, and religion. Emphasis is laid on the social function of education as being the most important instrument of individual welfare and social progress.

This course is not open to students who have credit for Philosophy 406.

657. Mathematical Logic. Three credit hours. Spring Quarter. Prerequisite, an acceptable course in elementary logic, or six Quarters of college mathematics. Mr. Farber.

The algebra of logic; relations, postulates, and deductive systems; the relation of mathematical logic to other types of logic, and its philosophical implications.

660. Minor Problems. Two to five credit hours. Autumn, Winter, Spring Quarters. Prerequisite, four Quarters of work in philosophy. All instructors.

Investigation of minor problems in the history of philosophy or systematic philosophy.

661. Nature and Man. Five credit hours. Autumn Quarter. Prerequisites, two of the following: Philosophy 601, 602, 603, or the consent of the instructor. Mr. Leighton.

A systematic consideration of the following topics: the nature of scientific method, the scientific conception of nature in its bearings on the problems of man; the nature of the self and society; the problem of values and the problem of the meaning of existence as a whole.

This course is not open to students who have credit for Philosophy 662.

665. Philosophy of History. Three credit hours. Autumn Quarter. Prerequisites, any two of the following: Philosophy 601, 602, 605, 656. Mr. Leighton.

A discussion of the place of history in the system of human knowledge, the humanistic significance of the historical attitude, the concepts of civilization, culture, development and progress. The aim of the course is to formulate a philosophy of culture.

This course is not open to students who have credit for Philosophy 820.

FOR GRADUATES

Prerequisite for Graduate Work: The courses named below presuppose good foundation courses either in psychology, logic and ethics or in the history of philosophy, and, in some cases, in all of these subjects. Prospective students are likewise strongly recommended to prepare for graduate work in this department by taking related courses in other departments. Psychology is regarded as related to all courses in philosophy. The following are suggested as related courses in other departments. For students of logic and metaphysics: mathematics, and natural sciences, especially general and theoretical physics, general and historical chemistry, and evolution (Zoology 409-410); for students of ethics and the philosophy of religion: sociology, politics, and history; for students of the history of philosophy: European history, and the history of Greek, German, English, and French literatures. As a qualification for the study of philosophy as a graduate "major," the student must previously have completed the equivalent of at least eighteen Quarter-credit hours in philosophy and psychology. In case of students who are taking a major in ethics, two Quarters' work in the principles of sociology may be accepted in partial fulfillment of the above requirement. Within the general field of philosophy graduate "majors" and "minors" may be taken in the following special groups: logic and metaphysics, ethics and social philosophy, the philosophy of religion, and the history of philosophy (ancient, medieval, and modern).

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Seminary in Systematic Philosophy. Three credit hours. Autumn Quarter. Mr. Leighton.

Topic for 1926: Scientific Method and the Organization of Knowledge.

802. Seminary in Systematic Philosophy. Three credit hours. Winter Quarter. Mr. Leighton.

Topic for 1927: Recent Evolutionistic Philosophy, especially the work of Bergson, Alexander, and Morgan.

803. Seminary in Systematic Philosophy. Three credit hours. Spring Quarter. Mr. Leighton.

Topic for 1927: Recent Realism, especially the work of English and German realists.

809-810-811. Research. Autumn, Winter, Spring Quarters. Three to ten credit hours in each Quarter. Mr. Leighton, Mr. Sabine, Mr. Chandler, Mr. Avey.

Properly qualified students may pursue research in any Quarter under the guidance of the department, with suitable credit.

815-816-817. Seminary in Social and Political Philosophy. Three credit hours. Autumn, Winter, Spring Quarters. Mr. Sabine.

A critical consideration of the conceptions of the leading philosophers of western civilization on the ideals and principles of social organization.

PHYSICAL EDUCATION

MEN

Office, The Gymnasium

PROFESSORS ST. JOHN, WILCE, CASTLEMAN, AND NICHOLS, ASSISTANT PROFESSOR TRAUTMAN, MR. DUFFEE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in physiology in addition to any prerequisites stated in the description of the courses. Course 683 requires also a fundamental course in psychology; 685, a fundamental course in public health; 691, a fundamental course in anatomy; and 692, a fundamental course in chemistry.

682. Organization and Administration of Physical Education. Five credit hours. Spring Quarter. Five lectures each week. Prerequisite, Physical Education 683. Mr. St. John, Miss Clark, Mr. Trautman.

A consideration of the problems of organization for physical education in elementary and secondary schools and colleges, including standards and methods in administration of interscholastic, intercollegiate, and intramural athletics. The first eight lectures will deal with problems common to both men and women's work. Thereafter, the women's classes will be conducted separately, with emphasis on problems peculiar to this field. The personnel of a department, athletic and gymnastic facilities, and construction, purchase and care of equipment, keeping of records and reports, handling of finances, schedule making, publicity, insignia and awards, managerial systems, scholastic and athletic eligibility, and professionalism, will be included in the problems discussed.

683. History and Principles of Physical Education. Five credit hours. Winter Quarter. Five lectures each week. Mr. Wilce.

An historical survey of physical education beginning with that of Greece and including contemporary developments and a consideration of the biological and educational aspects of physical education, with special reference to its place in education. This course is not open to students who have credit for Physical Education 681.

685. Prevention and Care of Injuries, Including Training of Athletes. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Duffee.

A consideration of the methods of prevention and care of injuries, especially emphasizing dangers and conditions arising in connection with physical education, and the condition of athletes for athletic contests.

691. Kinesiology. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Duffee.

Lectures and recitations dealing with the anatomical mechanism of movements. The purpose of the course is to acquaint the student with means of analyzing movements intelligently and prescribing programs of gymnastics, sports, and dancing for developmental or corrective purposes.

692. Hygiene and School Health Problems. Three credit hours. Winter Quarter. Three lectures each week. Miss Jones, Mr. Nichols.

A consideration of methods, courses of study and material used in health instruction in schools and colleges, together with discussions of medical inspection, symptoms and control of the common school diseases, problems relating to the health environment of the school child and the teacher.

WOMEN

Office, Pomerene Hall

PROFESSORS CLARK AND JONES, MISS GILMAN, MISS JOHNSON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: A fundamental course in physiology in addition to any prerequisites stated in the description of the courses. Course 671 requires also courses in anatomy and physical education; 682, a fundamental course in physical education; 683, a fundamental course in psychology; 691, a course in anatomy; and 692, a course in chemistry.

671. Therapeutic Gymnastics, Advanced (Women). Three credit hours. Autumn Quarter. Two lectures and three laboratory periods each week. Miss Jones, Miss Gilman.

Lectures and discussions of therapeutic gymnastics in elementary and secondary schools and colleges. Opportunity will be given for observation and practice in college groups and clinics. Practice will be given in first aid and massage.

682. Organization and Administration of Physical Education. Five credit hours. Spring Quarter. Five lectures each week. Prerequisite, Physical Education 683. Mr. St. John, Miss Clark, Mr. Trautman.

A consideration of the problems of organization for physical education in elementary and secondary schools and colleges, including standards and methods in administration of interscholastic, intercollegiate, and intramural athletics. The first eight lectures will deal with problems common to both men and women's work. Thereafter, the women's classes will be conducted separately, with emphasis on problems peculiar to this field. The personnel of a department, athletic and gymnastic facilities, and construction, purchase and care of equipment, keeping of records and reports, handling of finances, schedule making, publicity, insignia and awards, managerial systems, scholastic and athletic eligibility, and professionalism, will be included in the problems discussed.

683. History and Principles of Physical Education. Five credit hours. Winter Quarter. Five lectures each week. Mr. Wilce.

An historical survey of physical education beginning with that of Greece and including contemporary development and a consideration of the biological and educational aspects of physical education, with special reference to its place in education.

This course is not open to students who have credit for Physical Education 681.

691. Kinesiology. Three credit hours. Autumn Quarter. Two lectures and three laboratory periods each week. Miss Johnson.

Lectures and recitations dealing with the anatomical mechanism of movements. The purpose of the course is to acquaint the student with means of analyzing movements intelligently and prescribing programs of gymnastics, sports, and dancing for developmental or corrective purposes.

692. Hygiene and School Health Problems. Three credit hours. Winter Quarter. Three lectures each week. Miss Jones, Mr. Nichols.

A consideration of methods, courses of study and material used in health instruction in schools and colleges, together with discussion of medical inspection, symptoms and control of the common school diseases, problems relating to the health environment of the school child and the teacher.

PHYSICS

Office, 107 Mendenhall Laboratory

PROFESSORS COLE, EARHART, BLAKE, AND ALPHEUS W. SMITH, ASSISTANT PROFESSORS HEIL AND ALVA W. SMITH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in physics. Courses 607, 608, 609, 610, and 611 require also an acceptable course in calculus.

Students should consult with the instructor concerning details for prerequisite requirements.

602. Advanced Laboratory: Mechanics and Heat. Three credit hours. One Quarter. Autumn and Spring. Two three-hour laboratory periods each week. Mr. Heil.

603. Advanced Laboratory: Radiation. Three credit hours. Winter Quarter. Two three-hour laboratory periods each week. Mr. Heil.

An advanced laboratory course in exact measurements of indices of refraction, wave length, dispersion, polarization, absorption, spectrum analysis, etc.

604. Advanced Laboratory: Electrical Measurements. Three credit hours. One Quarter. Autumn and Spring. Two three-hour laboratory periods each week. Mr. Alva Smith.

An advanced laboratory course in exact measurements of currents, resistances and electromotive forces, magnetic permeability, capacity and inductance, use of oscillograph in the study of alternating and transient currents.

605. Advanced Laboratory: Ionization and Radioactivity. Three credit hours. Winter Quarter. Two three-hour laboratory periods each week. Mr. Heil.

An advanced laboratory course in the use of electroscope and electrometer for exact measurements of currents in gases, discharge of electricity from radioactive materials, absorption of radiation by matter, characteristic curves of three-electrode tubes, etc.

607. Advanced Light. Four credit hours. Winter Quarter. Three lectures and recitations and one two-hour laboratory period each week. Mr. Cole.

Lenses, systems of lenses, cardinal points, defects of images and their correction, optical instruments, spectroscopy, plane gratings, concave gratings, the ultra-violet, the infra-red, diffraction, interference, interferometers, photometry, spectrophotometer, polarization, optical rotation, displacement currents, Hertzian waves, dispersion theory, anomalous dispersion, rest-strahlen, X-rays and their spectra, K and L series, Quantum theory, Zeeman and Stark effects, atom models, Bohr theory.

608. Advanced Electricity. Four credit hours. Spring Quarter. Four lectures and recitations each week. Mr. Heil.

An introductory course in the mathematical theory of electricity and magnetism.

609. Molecular Physics and Heat. Four credit hours. Autumn Quarter. Four lectures and recitations each week. Mr. Earhart.

A study of the kinetic theory of gases, capillarity, osmosis, and related topics.

610. Conduction of Electricity through Gases and Radioactivity. Four credit hours. Winter Quarter. Four lectures and recitations each week. Mr. Earhart.

An introductory course on the passage of electricity through gases and evacuated tubes, ionic velocities, photo-electricity, determination of the elementary charge, discharge of electricity from incandescent solids, radioactive properties of matter, etc.

611. Modern Spectroscopy. Four credit hours. Spring Quarter. Four lectures and recitations each week. Physics 603 is advised as a prerequisite or concurrent course. Mr. Cole.

A discussion of recent progress in spectroscopy, covering the following topics: new form of prism spectroscope, theory of grating, Wadsworth mount for grating, Eagle mount for concave grating, the echelon and echelette, resolving power, recent infra-red work, new work in ultra-violet, rest-strahlen, and focal isolation, application

of interference methods, Zeeman effect, photography of spectra, absorption spectra, "raies ultimes".

Series line in spectra, Ritz principle of combination, Bohr's explanation, neutral and ionized states, ionization potential, types of series, electron orbits, generalization of Bohr's assumption, total and partial quantum numbers, Stark effect, intensity of lines. the principle of correspondence.

630-631-632. Minor Investigations. Three credit hours for one or two Quarters. Autumn, Winter, Spring Quarters. Prerequisites, two of the following laboratory courses: Physics 602, 603, 604, 605, or equivalent; and two of the following theoretical courses: Physics 607, 608, 609, 610, 611, or equivalent.

After consulting the instructor in charge, the student may select for investigation a subject in radiation, including X-rays, radioactivity, conduction of electricity through gases, radio communication, electricity and magnetism. Opportunity is also offered to repeat certain classical experiments in physics. Mr. Cole, Mr. Earhart, Mr. Blake, Mr. Alpheus Smith, Mr. Heil, Mr. Alva Smith.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 755.

FOR GRADUATES

Prerequisite for Graduate Work: The graduate courses in physics all presuppose a good course in college physics extending over at least a year and including laboratory work. In addition, the theoretical courses have a working knowledge of calculus as a prerequisite and the laboratory courses presuppose a year's work in the laboratory of a more advanced character than that included in the college course in general physics. A fair reading knowledge of German and French is highly desirable.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Advanced Theory of Light. Three credit hours. Autumn Quarter. Prerequisite, Physics 607 or its equivalent. Mr. Cole.

This course deals with fundamental principles and their application in recent experimental research. It includes such topics as propagation of waves in crystals, elliptical polarization, spectral series, broadening of spectrum lines. Doppler effect, Zeeman effect and new types of interferometer.

802. Advanced Theory of Light. Three credit hours. Winter Quarter. Mr. Cole.

This course is a continuation of Physics 801 dealing with such topics as recent work in infra-red, residual rays, focal isolation, X-ray wave lengths, spectro photometry, physical nature of light, group velocity, Maxwell theory, Hertz's verification, boundary conditions, theories of dispersion, relative motion of matter and ether, Einstein theory.

***803. Thermo-dynamics.** Three credit hours. Autumn Quarter. Prerequisite, Physics 609 or its equivalent. Mr. Alpheus W. Smith.

This course deals with the fundamental principles of thermo-dynamics and their application to such topics as osmotic pressure, electrolytic conduction, diluted and concentrated solutions, the phase rule, chemical equilibrium, metastability of matter, Nernst's heat theorem and the modern theories of specific heats.

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* Not given in 1926-1927.

*804. **Thermo-dynamics.** Three credit hours. Winter Quarter. Mr. Alpheus W. Smith.

This course is a continuation of Physics 803.

805. **Theory of Electricity and Magnetism.** Three credit hours. Autumn Quarter. Prerequisite, Physics 608 or its equivalent. Mr. Alpheus W. Smith.

This course deals with the electromagnetic theory as originally developed by Maxwell. It includes also a consideration of the modern theories of electricity and magnetism. It is essentially a mathematical course.

806. **Theory of Electricity and Magnetism.** Three credit hours. Winter Quarter. Mr. Alpheus W. Smith.

This course is a continuation of Physics 805.

807. **Theory of Electricity and Magnetism.** Three credit hours. Spring Quarter. Mr. Alpheus W. Smith.

This course is a continuation of Physics 806.

809. **Theory of Oscillations.** Three credit hours. Autumn Quarter. Three lectures and recitations each week. Prerequisite, Physics 608 or equivalent. Mr. Blake.

The general theory of small oscillations will be developed and applied both to acoustical and electrical vibrations. The loaded line will be studied, the "telegraph equation" developed, and the methods of eliminating distortions in telephone circuits given. Both damped wave and continuous wave radiators will be studied, an expression for the radiation from a wireless antenna developed and compared with experiment and the theory of the thermionic tube as an oscillator and as an amplifier presented and applied. Power transmission circuits will be studied by means of hyperbolic functions.

810. **Theory of Oscillations.** Three credit hours. Winter Quarter. Mr. Blake.

This course is a continuation of Physics 809.

811. **Theory of Oscillations.** Three credit hours. Spring Quarter. Mr. Blake.

This course is a continuation of Physics 810.

812. **Seminary in Physics.** One credit hour. Autumn, Winter, Spring Quarters. Prerequisite, two years of college physics. A maximum of three credit hours may be secured in this course. Mr. Cole.

The work in this course consists of reviews of important recent research in physics and reports upon the same before the department instructors at their weekly journal meeting.

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* Not given in 1926-1927.

*813. **Electronic Theory and Atomic and Molecular Structure.** Three credit hours. Autumn Quarter. Three lectures and recitations each week. Prerequisite, Physics 610 or equivalent. Mr. Blake.

The evidence for a nuclear atom will be given and the Rutherford-Bohr theory of the nuclear atom will be developed. The quantum theory will be developed and applied to problems of atomic and molecular structures, especially to the fine line structure of spectroscopy, including X-ray spectroscopy. The quantum theory will also be applied to the determination of specific heats and to molecular rotations in the infra-red. Both the chemical or static atom and the physical or dynamic atom will be studied and compared. This course is strongly recommended to students of fundamental physical and chemical theories of matter.

*814. **Electronic Theory and Atomic and Molecular Structure.** Three credit hours. Spring Quarter. Mr. Blake.

This course is a continuation of Physics 813.

*815. **Electronic Theory and Atomic and Molecular Structure.** Three credit hours. Spring Quarter. Mr. Blake.

This course is a continuation of Physics 814.

817. **Theoretical Mechanics.** Three credit hours. Autumn Quarter. Three lectures and recitations each week. Prerequisites, college physics and calculus. Mr. Blake.

The equations of motion of a body will be developed in generalized coordinates and solved. The principle of least action and Hamilton's principle will be developed and applied both to Newtonian and Einsteinian mechanics. The fundamental principles of mechanics will be applied to various problems both in physics and chemistry. This course should be taken by all graduate students of physics who are interested in seeing how one unifying principle underlies the whole of physics.

818. **Theoretical Mechanics.** Three credit hours. Winter Quarter. Mr. Blake.

This course is a continuation of Physics 817.

819. **Theoretical Mechanics.** Three credit hours. Spring Quarter. Mr. Blake.

This course is a continuation of Physics 818.

821. **Conduction of Electricity through Gases.** Three credit hours. Spring Quarter. Prerequisites, Physics 609, 610, or equivalent. Mr. Earhart.

A seminary course covering important researches on the electronic theory as applied to gases.

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* Not given in 1926-1927.

*822. **Radioactivity.** Three credit hours. Spring Quarter. Prerequisite, Physics 610 or equivalent. Mr. Heil.

A course of graduate lectures and reports covering in detail some of the more striking experiments of the last twenty years on the properties of radioactive materials and their transformations, the theory of exact measurements of small currents in gases, etc.

830. **Research Laboratory.** Three credit hours. Autumn Quarter. Prerequisite, two years of laboratory physics. Mr. Cole, Mr. Earhart, Mr. Blake, Mr. Alpheus Smith, Mr. Heil, Mr. Alva Smith.

831. **Research Laboratory.** Three credit hours. Winter Quarter. Prerequisite, two years of laboratory physics. Mr. Cole, Mr. Earhart, Mr. Blake, Mr. Alpheus Smith, Mr. Heil, Mr. Alva Smith.

832. **Research Laboratory.** Three credit hours. Spring Quarter. Prerequisite, two years of laboratory physics. Mr. Cole, Mr. Earhart, Mr. Blake, Mr. Alpheus Smith, Mr. Heil, Mr. Alva Smith.

PHYSIOLOGICAL CHEMISTRY, PHARMACOLOGY, AND MATERIA MEDICA

Office, Hamilton Hall

PROFESSOR SMITH, ASSISTANT PROFESSOR BROWN, MISS WIKOFF

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in general chemistry, qualitative analysis, and organic chemistry in addition to any prerequisites stated in the description of the courses.

601. **Physiological Chemistry.** Five credit hours. Autumn Quarter. Two lectures, one quiz, and six laboratory hours each week. Mr. Smith, Mr. Brown, Miss Wikoff, and assistants.

The chemistry of carbohydrates, lipins, and proteins.

602. **Physiological Chemistry.** Five credit hours. Winter Quarter. Two lectures, one quiz, and nine laboratory hours each week. Prerequisite, Physiological Chemistry 601. Mr. Smith, Mr. Brown, Miss Wikoff, and assistants.

The chemistry of digestion, metabolism and excretion.

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* Not given in 1926-1927.

603. Quantitative Methods of Blood and Urine Analysis. Three credit hours. One Quarter. Autumn and Winter. One lecture and six laboratory hours each week. Prerequisites, Physiological Chemistry 602. Mr. Smith, Miss Wikoff.

Determination of important constituents of the blood and urine.

604. Evaluation of Diets. Two credit hours. Spring Quarter. Two lectures or two quizzes each week. Prerequisites, Physiology 601, 602, 603, and Physiological Chemistry 601, 602. Mr. Smith.

This course is designed to familiarize the students with food values.

605. Pharmacology. Five credit hours. Spring Quarter. Two lectures, one quiz, and six laboratory hours each week. Prerequisites, Physiology 604, 605, 606, and Physiological Chemistry 601, 602. Mr. Smith and assistants.

This course treats of the modification of the normal physiological processes of the body by the presence of the more common drugs used in medicine. A review of prescription writing is given together with a brief laboratory course in toxicology.

607. Methods of Biologic Drug Assay. Two credit hours. Spring Quarter. One lecture and three laboratory hours each week. Prerequisite, Pharmacology 605. Mr. Smith.

This course includes consideration of the methods in common use for the biological standardization of drugs.

608. Toxicology. Three credit hours. Winter Quarter. One lecture and six laboratory hours each week. Prerequisite, Pharmacology 605 or equivalent. Mr. Smith.

An advanced course dealing with the effects and detection of poisons, including food preservatives.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Research in Physiological Chemistry. Five or ten credit hours. Autumn Quarter. Investigational work with conferences and assigned reading. Prerequisites, Physiological Chemistry 601, 602, 603. Mr. Smith.

The subject matter of this course will vary with the individual needs of the student.

802. Research in Physiological Chemistry. Five or ten credit hours. Winter Quarter. Mr. Smith.

See description of Physiological Chemistry 801.

803. Research in Physiological Chemistry. Five or ten credit hours. Spring Quarter. Mr. Smith.

See description of Physiological Chemistry 801.

804-805-806. Vegetable Materia Medica. Three credit hours. Autumn, Winter, Spring Quarters. One conference hour and two three-hour laboratory periods each week. Given biennially. Prerequisite, organic and physical chemistry. Mr. Smith.

A critical application of plant chemistry to the study of the production, biochemistry and utilization of medicinal plants. Presentation will be by the "case" method, with special emphasis on important U. S. P. drugs.

807. Advanced Physiological Chemistry. Three credit hours. Spring Quarter. One lecture or quiz and six laboratory hours each week. Prerequisite, Physiological Chemistry 602. Mr. Brown.

An advanced course in biochemical preparations, including the isolation of enzymes, lipins, proteins, and such hormones as epinephrin and insulin.

810. Research in Materia Medica. Three to ten credit hours. Hours to be arranged. Course 804 or 807 should either precede or accompany this election. Mr. Smith.

Problems assigned will have as their objectives either the investigation of plant products of medicinal interest, or the synthesis of chemicals desired for pharmacological study. Close cooperation will be maintained with the pharmacological laboratory.

PHYSIOLOGY

Office, Hamilton Hall

PROFESSORS HOSKINS AND BLEILE, ASSISTANT PROFESSORS SEYMOUR, McPEEK, AND E. P. DURRANT, MR. HITCHCOCK, MR. LEE, MR. R. R. DURANT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in physiology or equivalent biological training, in addition to any prerequisites stated in the description of the courses.

601. Advanced Physiology. Five credit hours. Autumn Quarter. Two lecture or quiz and nine laboratory hours each week. Mr. Hoskins, Mr. Seymour, Mr. McPeek, Mr. E. P. Durrant, Mr. Hitchcock, Mr. Lee, Mr. R. R. Durant, and assistants.

This course deals with the physiology of the contractile tissues, reflexes, lymph, blood and circulation. It is based primarily upon individual laboratory work.

602. Advanced Physiology. Five credit hours. Winter Quarter. Two lecture or quiz and nine laboratory hours each week. Mr. Hoskins, Mr. Seymour, Mr. McPeek, Mr. E. P. Durrant, Mr. Hitchcock, Mr. Lee, Mr. R. R. Durant, and assistants.

A study of respiration, digestion, excretion, metabolism, central nervous system, and sense organs, based upon laboratory experiments on frogs, turtles, and mammals.

603. Advanced Physiology. Two credit hours. Spring Quarter. Two quiz hours each week. Prerequisites, Physiology 601 and 602. Mr. Hoskins, Mr. McPeek.

A didactic review of the subject matter of Physiology 601 and 602.

604. Advanced Physiology. Six credit hours. Autumn Quarter. Three lecture or recitation hours and nine laboratory hours each week. Mr. Hoskins, Mr. Seymour, Mr. McPeek. Mr. E. P. Durrant, Mr. Hitchcock, Mr. Lee, Mr. R. R. Durant, and assistants.

This course deals with the physiology of the contractile tissues, reflexes, lymph, blood and circulation. The course is based upon animal experimentation by the students, supplemented by demonstrations by the instructors. The bearing of the data obtained upon clinical phenomena is considered.

This course is not open to students who have credit for Physiology 601.

605. Advanced Physiology. Six credit hours. Winter Quarter. Three lecture or recitation hours and nine laboratory hours each week. Mr. Hoskins, Mr. Seymour, Mr. McPeek, Mr. E. P. Durrant, Mr. Lee, Mr. R. R. Durant, and assistants.

This course is a continuation of Physiology 604, dealing with respiration, digestion, excretion, metabolism, the central nervous system and sense organs.

This course is not open to students who have credit for Physiology 602.

606. Advanced Physiology. Two credit hours. Spring Quarter. Two lecture or quiz hours each week. Prerequisites, Physiology 604 and 605. Mr. Hoskins, Mr. Seymour, Mr. McPeek.

This course is a didactic review of the subject matter covered in Physiology 604 and 605.

This course is not open to students who have credit for Physiology 603.

608. Physiological Laboratory. Five credit hours. Autumn Quarter. Two conference and nine laboratory hours each week. Prerequisites, Physiology 601 and 602 or equivalent training. Mr. Bleile and assistants.

An exclusively laboratory course in advanced and specialized physiology of metabolism, blood, digestion, foods, etc., as the student may elect.

This course should not be elected without previous conference with the instructor in charge.

609. Physiological Laboratory. Five credit hours. Winter Quarter. Two conference and nine laboratory hours each week. Prerequisites, Physiology 601 and 602 or equivalent training. Mr. Bleile and assistants.

See description under Physiology 608.

This course should not be elected without previous conference with the instructor in charge.

610. Physiological Laboratory. Five credit hours. Spring Quarter. Two conference and nine laboratory hours each week. Prerequisites, Physiology 601 and 602 or equivalent training. Mr. Bleile and assistants.

See description under Physiology 608.

This course should not be elected without previous conference with the instructor in charge.

611. Physiological Laboratory. Five credit hours. Autumn Quarter. Two conference and nine laboratory hours each week. Prerequisites, Physiology 601 and 602 or equivalent training. Mr. Hoskins, Mr. Seymour, and assistants.

An exclusively laboratory course in advanced and specialized physiology of circulation, respiration, neuromuscular phenomena, endocrinology, etc., as the student may elect.

This course should not be elected without previous conference with the instructor in charge.

612. Physiological Laboratory. Five credit hours. Winter Quarter. Two conference and nine laboratory hours each week. Prerequisites, Physiology 601 and 602 or equivalent training. Mr. Hoskins, Mr. Seymour, and assistants.

See description under Physiology 611.

This course should not be elected without previous conference with the instructor in charge.

613. Physiological Laboratory. Five credit hours. Spring Quarter. Two conference and nine laboratory hours each week. Prerequisites, Physiology 601 and 602 or equivalent training. Mr. Hoskins, Mr. Seymour, and assistants.

See description under Physiology 611.

This course should not be elected without previous conference with the instructor in charge.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Research Physiology: Minor. Five credit hours. Autumn Quarter. Investigational work with conferences and assigned reading. Prerequisites, Physiology 601 and 602 or equivalent in biological training. Mr. Hoskins, Mr. Bleile.

The subject matter covered in this course will be adapted to the needs of individual students.

802. Research Physiology: Minor. Five credit hours. Winter Quarter.

For description see Physiology 801.

803. Research Physiology: Minor. Five credit hours. Spring Quarter.

For description see Physiology 801.

804. Research Physiology: Major. Ten or fifteen credit hours. Autumn Quarter. Prerequisites, Physiology 601 and 602 or equivalent biological training. Mr. Hoskins, Mr. Bleile.

Original investigation, assigned reading, and conferences. Preparation of thesis.

805. Research Physiology: Major. Ten or fifteen credit hours. Winter Quarter.

For description see Physiology 804.

806. Research Physiology: Major. Ten or fifteen credit hours. Spring Quarter.

For description see Physiology 804.

POLITICAL ECONOMY

(See Economics and Sociology)

POLITICAL SCIENCE

Office, 102 University Hall

PROFESSORS SPENCER AND COKER, MR. PADDOCK, MR. HELMS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in political science in addition to any prerequisites stated in the description of the courses.

†604. State Legislative and Administrative Problems. Three credit hours. Three meetings each week. Mr. Coker.

The scope of state powers and activities; problems and methods of state government in the fields of finance, business and industrial regulation, and legislative procedure; the executive budget and administrative reorganization.

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† Not given during the academic year, 1926-1927.

607. Municipal Government. Five credit hours. Autumn Quarter. Five meetings each week.

A comparative study of modern municipalities in the United States and the principal countries of Europe; their social significance; their governmental structure; their relation to the state; the experience with government by council, mayor, commission, and manager; methods of popular participation. Lectures, investigations, and reports on particular cities.

608. Municipal Functions. Three credit hours. Winter Quarter. Three meetings each week. Prerequisite, Political Science 607.

A study of the activities of modern municipalities: the organization, methods employed, policies and problems in the fields of finance; health and sanitation; police and fire protection; education; city planning; housing; public utilities; charities and corrections; recreation.

611. Introduction to Jurisprudence. Five credit hours. Autumn Quarter. Five meetings each week. Mr. Spencer.

An introductory study of legal concepts. An attempt is made both to give the prospective law student an analytical and historical guide into his subject, and to give those who do not intend to pursue the study of law an idea of its significance in social organization, and its relation to political and economic science.

612. International Law. Three credit hours. Winter Quarter. Three meetings each week. Mr. Spencer.

A study of the principles of international law in their growth and present status, with particular attention to unsettled points, and problems raised by the World War.

613. Contemporary International Politics. Five credit hours. Spring Quarter. Five meetings each week. Mr. Spencer.

Methods and ideals of diplomacy; current problems in international relations, such as the reorganization of Europe, Pan-Americanism, and the Far East; tendencies toward administrative, judicial, and legislative world-organization.

616. American Constitutional Law. Three credit hours. Autumn Quarter. Three meetings each week. Mr. Coker.

A study of leading constitutional principles in the United States as interpreted by the courts. Special studies will be made of such topics as the following: the adoption and amendment of constitutions with special attention to the later amendments to the Federal Constitution; the judicial power to declare laws unconstitutional; citizenship; private rights, with particular reference to freedom of speech and the press; the powers of Congress, with particular attention to taxation and the regulation of commerce; war powers; police power of the states; political privileges. Designed for students who desire a non-technical knowledge of the more important federal and state constitutional principles in the United States.

619. History of Political Theories. Three credit hours. Winter Quarter. Three meetings each week. Mr. Coker.

The development of leading ideas in politics from the time of the Greeks to the end of the eighteenth century.

620. Recent Political Theories. Three credit hours. Spring Quarter. Three meetings each week. Mr. Coker.

A study of leading political ideas in Europe and America since the beginning of the nineteenth century, with special reference to recent and contemporary doctrines and

movements. It will embody a study of the political writings of important authors and of characteristic ideas of groups indicated by the terms liberalism, internationalism, and pluralism; and an analysis of current theories as to the relation of the state to property and labor, including the political programs of recent socialism, syndicalism, and guild socialism.

*631-632. Methods of Governmental Research. Two credit hours. Autumn and Winter Quarters. Two meetings each week.

Direction and training of students in methods of gathering and presenting data on governmental problems. Lectures, assigned readings, special investigations, field work under the direction of the Bureau of Governmental Research and the Ohio Institute of Public Efficiency.

FOR GRADUATES

Prerequisite for Graduate Work: Graduate work in this department presupposes a foundation laid in college courses in the historical and social sciences. As a qualification for the study of political science as a graduate "major," the student must have completed previously the equivalent of six three-hour Quarter-courses, chosen among the subjects of political science, history, and economics. This must include three Quarters' work in political science.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

HISTORICAL CONFERENCE: In addition to the formal courses indicated below, a monthly conference is held, composed of the instructors and graduate students in the departments of History and Political Science. The discussions in this conference cover a wide range of topics of general interest to students and investigators in these fields.

801-802-803. Research in Political Science. Three to five credit hours. Autumn, Winter, Spring Quarters. Prerequisite, six Quarter-courses in political science.

This course presents an opportunity for advanced research in political science, in such portion of the field as may be agreed upon with the individual student. It is offered in every Quarter, and with any of the members of the department in residence.

POULTRY HUSBANDRY

Office, Judging Pavilion

PROFESSOR DAKAN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in poultry husbandry in addition to any prerequisites stated in the description of the courses.

601. Poultry Feeding and Housing. Three credit hours. Winter Quarter. Two recitations and one two-hour laboratory period each week. Mr. Dakan.

The principles and practices of poultry feeding, planning of poultry houses, and a study of poultry farms.

* Not given in 1926-1927.

603. Marketing Poultry Products. Three credit hours. Autumn Quarter. Three recitations each week. Also reporting twice daily for two weeks. Mr. Dakan.

This course deals with the commercial practices in handling eggs, in poultry crate fattening, killing, and dressing poultry for market, cooperative poultry associations, and the marketing of poultry and eggs.

605. Poultry Farm Management. Three credit hours. Spring Quarter. Three recitation periods each week. Prerequisites, Poultry Husbandry 601, 602 and 603. Mr. Dakan.

The principles of farm management as applied to the poultry farm; selection of the farm; use of poultry farm score card; farm layout and arrangement of buildings; study of farm records; and advertising. As a final problem, each student will work out a plan for the management of a poultry enterprise that seems most adaptable to his personal needs. The course will require several excursions to nearby poultry farms in addition to recitation periods. This course is a summary of all poultry courses and should be taken during the senior year and preceded or accompanied by all other courses in poultry husbandry.

701. Special Problems in Poultry Husbandry. Three to fifteen credit hours, taken in units of three to five hours each Quarter for one or more Quarters. Autumn, Winter, Spring Quarters.

This course is limited to advanced students only, by arrangement with the professor in charge. Each student will be required to make an exhaustive study of some particular phase of poultry husbandry and write a thesis of his study and research. The work must comprise in part some original investigation by the student.

PRINCIPLES AND PRACTICE OF EDUCATION

Office, Education Building

PROFESSORS BODE, TWISS, BRIM, THAYER, AND PAHLOW, ASSISTANT PROFESSOR LANDSITTEL, MR. HULLFISH, MR. MADDOX, MR. SCHOLTZ, MR. ALBERTY

GENERAL PRINCIPLES

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fifteen Quarter hours in educational subjects, philosophy, or psychology. Courses 660 and 661 require fundamental courses in physics and chemistry.

Students should consult the instructor for details concerning prerequisites.

601. Moral Ideals in Education. Three credit hours. Autumn Quarter. Mr. Hullfish.

A consideration of types of moral ideals, of the relation of moral values to school subjects, and of the question of direct and systematic moral instruction in the schools.

This course is not open to students who have credit for Principles of Education 350.

605. Cultural and Vocational Ideals in Education. Four credit hours. Winter Quarter. Mr. Maddox.

A study of cultural and vocational aims, with reference to their historic background and contemporary opinion, and in their significance for a democratic society.

This course is not open to students who have credit for Principles of Education 352.

619. Social Aims in Education. Three credit hours. Winter Quarter. Students are advised to take a course in social psychology and a course in the history of education. Mr. Maddox.

A study of typical theories as to the social purpose of education with special emphasis upon their significance for moral and democratic ideals, and upon the function of the school as a means of social progress.

This course is not open to students who have credit for Principles of Education 450.

620. Conceptions of Mind in Educational Theory. Three credit hours. Autumn Quarter. Mr. Bode, Mr. Maddox, Mr. Scholtz, Mr. Alberty.

A study of the doctrines of mind that have exercised a determining influence upon educational theory and practice.

This course is not open to students who have credit for Principles of Education 354.

640. Modern Tendencies in Education. Three credit hours. Spring Quarter. Mr. Bode, Mr. Maddox, Mr. Scholtz, Mr. Alberty.

A discussion of current doctrines and controversies, in the light of their historic background and their philosophical implications.

This course is not open to students who have credit for Principles of Education 356.

643. The Doctrine of Interest and Apperception. Three credit hours. Winter Quarter. Mr. Scholtz.

The role of interest and apperception in modern educational procedure. Reference will be made to theories of Herbart and the Herbartians in so far as they apply to these problems.

645. Social Education. Three credit hours. Spring Quarter. Wide readings, papers, lectures, and discussions. Mr. Lumley.

An examination of educational agencies and processes other than those of the school, which contribute to the enlightenment and socialization of the individual. An analysis of childhood's isolation, the methods of communication and control, the influence of the family, the playgrounds, the industrial organization, the church, and the state.

651-652-653. Minor Problems. Two to four credit hours. Autumn, Winter, Spring Quarters. Before registering for this course students must secure the permission of the instructor. Mr. Bode and others.

Investigation of minor problems in the field of principles and practice of education.

By permission of the head of the department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

†680. **The Place of the Schools in the Social Organization.** Three credit hours. Lectures and discussions. Prerequisite, Principles of Education 401.

The course will deal with the following topics: the social and educational philosophy of the superintendent of schools; the function of the superintendent as an educational leader—(a) with respect to the community, (b) with respect to the teaching personnel; the construction of an educational program for the community; social aims and ideals as embodied in unique systems of schools.

This course is not open to students who have credit for Principles of Education 380 or 381.

682. **Theories of the Educative Process.** Three credit hours. Spring Quarter. Lectures and conferences. Prerequisites, senior standing in the College of Education and Principles of Education 620, or twenty-five hours in educational subjects, philosophy or psychology, including Principles of Education 620 and five hours in elementary psychology. These requirements may be modified by special request, in the case of persons of maturity and experience. Mr. Hullfish.

A comparative study of contemporary writers in the field of education for the purpose of developing and formulating the differences in educational theory and practice that are involved in the divergent treatments of such topics as interest, duty, habit, ideals, transfer of training and thinking.

683. **The Thinking Process in its Educational Bearings.** Three credit hours. Winter Quarter. Lectures and conferences. Prerequisites, senior standing in the College of Education or twenty-five hours in educational subjects, philosophy or psychology, including a course in principles of education and a course in psychology. These requirements may be modified by special request, in the case of persons of maturity and experience. Mr. Alberty.

A study of the thinking process, for the purpose of tracing its implications for educational theory and classroom practice.

684. **The Place of Scientific Method in Education.** Three credit hours. Winter Quarter. Prerequisites, senior standing in the College of Education and Principles of Education 640, or twenty-five hours in educational subjects, philosophy or psychology, including Principles of Education 640 and five hours in elementary psychology, and three Quarters of college science. These requirements may be modified by special request, in the case of persons of maturity and experience. Mr. Scholtz.

An inquiry into the precise nature and field of scientific method, together with a discussion of the important contributions of the method to educational practices and a consideration of the possible limitations of the application of science to education.

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† Not given during the academic year, 1926-1927.

SECONDARY EDUCATION

FOR ADVANCED UNDERGRADUATES AND GRADUATES

NOTE: Courses 700 to 760 inclusive will not be counted toward a graduate major or minor in the Department of Principles and Practice of Education.

610. Supervision of Teaching in Secondary Schools. Three credit hours. One Quarter. Autumn and Winter. Consent of instructor necessary. Mr. Thayer, Mr. Alberty.

The problems involving cooperation between supervisors and teachers. Approved practices in the supervision of classroom work and the evaluation of methods and results.

This course is not open to students who have credit for Principles of Education 357 or 358 or 611 or 612.

625. Problems of Curriculum Construction in Secondary Education. Three credit hours. Winter Quarter. Mr. Thayer.

A critical study of present curriculum material in relation to school objectives and pupil needs. The former procedure and present tendency in curriculum construction will be evaluated. The most effective type of curriculum, and the function of supervisor and teacher in its construction will be considered.

This course is not open to students who have credit for Principles of Education 362 or 363.

651-652-653. Minor Problems. Two to four credit hours. Autumn, Winter, Spring Quarters. Before registering for this course students must secure the permission of the instructor. Mr. Bode and others.

Investigation of minor problems in the field of principles and practice of education.

By permission of the head of the department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

660. Methods and Problems of the Physical Sciences. Four credit hours. Autumn Quarter. Mr. Twiss.

Students in the College of Education who are majoring in any of the non-biological sciences must secure credit for four hours of work in Principles of Education 660, 661, 364, 365. These courses are elective for other students in the College of Education and for students in the other colleges.

The purposes of this course are: (1) to trace the ideas which have dominated creative thinking in the physical sciences; (2) to discuss the factors which have given direction and impetus to the development of these sciences; (3) to study the subjects and personalities that have had most to do with their development; (4) to give an understanding of the methods by which the outstanding scientific work has been done and the methods by which it must be stimulated in others; (5) to discuss the scope, opportunities, important problems and centers of development in the physical sciences; (6) to interpret the influence of science in education and in civilization; (7) to give a comprehensive picture of the nature, influence, and development of the scientific mind.

661. Methods and Problems of the Physical Sciences. Four credit hours. Spring Quarter. Mr. Twiss.

For description see Principles of Education 660.

700. The Teaching of American History. Three credit hours. Autumn Quarter. Three meetings each week. This course must be taken by all who expect to be recommended for teaching positions in the subject. Mr. Knight.

Lectures, readings, and quiz upon methods of teaching history in the secondary schools, schemes of courses, equipment, examination of textbooks; followed by practice work in the preparation of lessons for teaching, and the conduct of recitations in American history.

This course is not open to students who have credit for American History 610.

705. The Teaching of Biology. Three credit hours. Spring Quarter. Three recitations each week. Mr. Transeau (Botany), Mr. Barrows (Zoology).

This course is given primarily for the students in the College of Education who expect to teach high-school biology. The work will include lectures and demonstrations with discussion of the best methods of presenting botany, zoology, and biology to high school students.

This course is not open to students who have credit for Botany 515 or Zoology 515.

710. The Teaching of Chemistry. Three credit hours. Spring Quarter. Three conferences each week. Mr. McPherson.

This course consists of reports upon assigned readings in educational journals; of discussions concerning the proper place of chemistry in school curricula, and of the methods of conducting lecture and laboratory work. Such subjects as the proper planning of laboratory, the purchase of materials, and similar problems confronting the teacher of chemistry are also discussed.

This course is not open to students who have credit for Chemistry 781.

715. The Teaching of English. Three credit hours. Spring Quarter. Mr. Denney.

This course is not open to students who have credit for English 681.

†716. The Teaching and Supervision of Journalism in Secondary Schools. Three credit hours. Four recitations and fours hours of laboratory work on the Lantern each week. Not open to Freshmen. Mr. Getzloe.

This course is intended for persons who have been teaching or who expect to teach journalism in secondary schools, or to act as faculty advisers for school newspapers, magazines, or annuals. It includes a general survey of the editorial, business, and mechanical activities of newspaper and magazine publication, with special emphasis on those which are of greatest value and interest to students.

This course is open only to students registered in the College of Education and graduate students, except by special permission.

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† Not given during the academic year, 1926-1927.

720. The Teaching of European History. Three credit hours. Spring Quarter. Three class periods each week. Required of all who expect to ask the department for recommendation to teaching positions. Mr. Siebert.

Lectures, assigned readings, and discussions. A consideration of methods, arrangement of courses, equipment and textbooks used in secondary schools: followed by practice in preparing lessons for teaching and in conducting recitations in European history. This course will naturally be taken as a continuation of American History 610.

This course is not open to students who have credit for European History 647.

†725. The Teaching of German. Three credit hours. Three hours lecture and quiz each week. Prerequisite, six Quarters of college German and consent of the instructor. Mr. Evans.

A critical study of the methods of teaching modern foreign languages. Lectures, reports, and practice teaching.

This course is not open to students who have credit for German 665.

730. Methods of Teaching Latin. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Hodgman.

Lectures and assigned readings on methods of teaching Latin in the secondary schools. Place and value of Latin in education; bibliography; illustrative exercises in the Latin authors used in high schools.

This course is not open to students who have credit for Principles of Education 731 or Latin 617.

†731. The Teaching of Latin. Three credit hours. Prerequisite, six Quarters of college Latin, or the consent of the instructor. Mr. Ogle.

A general course based primarily upon the authors read in the secondary schools. Selections from each will be studied in detail to afford practice in the fundamentals of grammar, in the art of expression, and the arts of translation and interpretation. Topics directly concerned with the work of the classroom will be discussed, such as the ends of the study, the methods best adapted to attain them, the place and purpose of prose composition, the use of translation, illustrative material.

This course is not open to students who have credit for Principles of Education 730 or Latin 617. It may be counted as part of a major or minor in Latin.

735. The Teaching of Mathematics. Three credit hours. Autumn Quarter. Three recitations each week. Lectures, discussions, and practice teaching. Required of students in the College of Education who are majoring in mathematics. Prerequisite, Mathematics 443 or 142. Mr. Arnold.

The educational value of the study of mathematics; the content matter of the various courses in secondary and early collegiate mathematics; modes and methods; recent and contemporary studies of the teaching of mathematics.

This course is not open to students who have credit for Mathematics 681.

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† Not given during the academic year, 1926-1927.

740. The Teaching of French. Three credit hours. Winter Quarter. Three lectures each week. Prerequisite, six Quarters of French including French 627, 628, and a course in French conversation. Required of all students desiring the department recommendation as a teacher of French. Mr. Rockwood.

Special problems and difficulties in the teaching of French. Teacher's equipment. Classroom aids. Lectures, discussions, practice in conducting recitations.

This course is not open to students who have credit for French 622.

NOTE: Students registering for this course must not register for any course at ten o'clock, as this period must be kept open for classroom visitation.

745. The Teaching of Spanish. Three credit hours. Spring Quarter. Three recitations each week. Prerequisites, Spanish 617 and 620, and the consent of the instructor. Mr. Hendrix, Mr. Russell.

Methodology and bibliography.

This course is not open to students who have credit for Spanish 618.

750. The Teaching of Mechanical Drawing. Three credit hours. Autumn Quarter. One lecture and two three-hour laboratory periods each week. Mr. French.

This course is not open to students who have credit for Engineering Drawing 431 or 531.

751. The Teaching of Mechanical Drawing. Three credit hours. Winter Quarter. One lecture and two three-hour laboratory periods each week. Prerequisite, Principles of Education 750. Mr. French.

This course is not open to students who have credit for Engineering Drawing 432 or 532.

755. The Teaching of Physics. Three credit hours. Spring Quarter. Prerequisite, two Quarters' work in college physics. Mr. Cole.

This course is not open to students who have credit for Physics 420.

760. Spoken and Written English: Teachers' Course. Three credit hours. Spring Quarter. Mr. Wiley.

Classroom practice designed to assist teachers of composition in secondary schools. Definite suggestions in the following: how to prepare students for debating and speaking contests; the nature of speech training in secondary schools; composition; investigation of subject, recording, organizing, outlining, and writing up the material; delivering of an address, including drill in pronunciation and articulation. Not open to Freshmen. Open only to teachers in secondary schools.

This course is not open to students who have credit for Public Speaking 680.

ELEMENTARY AND RURAL EDUCATION

FOR ADVANCED UNDERGRADUATES AND GRADUATES

612. Survey of Scientific Investigations in Elementary School Subjects. Three credit hours. Spring Quarter. Mr. Brim.

The contributions of scientific research to the teaching of the elementary school subjects. Methods and results will be examined and the implications for schoolroom procedure considered.

This course is not open to students who have credit for Principles of Education 374.

613. Supervision of Elementary School Teaching. Three credit hours. Spring Quarter. Mr. Brim.

The distinctive function of supervision, the problems involved, the requirements for efficiency in supervision, the methods of diagnosis and evaluation of teaching and learning procedure, ways and means of improving instruction, maintaining teacher morale, and stimulating cooperative work.

This course is not open to students who have credit for Principles of Education 360 or 361.

614. Curriculum Construction in Elementary Education. Three credit hours. Autumn Quarter. Mr. Brim.

A critical study of present curriculum materials in relation to school objectives and pupil needs. The former procedure and present tendency in curriculum construction will be evaluated. The most effective type of curriculum, and function of supervisor, teacher and pupil in its construction will be considered.

615. Experimental Elementary Schools. Three credit hours. Autumn Quarter. Mr. Brim.

A study of the attempt to demonstrate and test the different educational theories in elementary schools throughout the country. These schools will be studied and evaluated in relation to principles.

This course is not open to students who have credit for Principles of Education 370.

616. Elementary Teacher Training. Four credit hours. Winter Quarter. Mr. Landsittel.

A study of the function, content and organization of courses of study designed to contribute toward the training of teachers for elementary schools. Standards of organization and training, means of capitalizing subject-matter courses, the interrelations of professional courses, and direction of observation and practice teaching will receive special consideration.

617. Supervision of Rural Elementary Schools. Three credit hours. Autumn Quarter. Mr. Brim.

Specific attention will be given to the problems of the supervisor of rural schools. Standards for judging the several activities to be supervised, the analysis and evaluation of the usual procedure, ways and means of improving the teacher's work through conferences, demonstration teaching, directed study of classroom problems, etc., will be discussed.

618. Rural Teacher Training. Five credit hours. Spring Quarter. Mr. Brim.

A course given specifically for those who are responsible for training rural teachers in normal colleges and in county normal schools. Problems in teacher training confronted by members of the class will be carefully considered. Desirable curriculum content, organization of work, and provision for observation and practice teaching will be stressed.

This course is not open to students who have credit for Principles of Education 372.

651-652-653. Minor Problems. Two to four credit hours. Autumn, Winter, Spring Quarters. Before registering for this course students must secure the permission of the instructor. Mr. Bode and others.

Investigation of minor problems in the field of principles and practice of education.

By permission of the head of the department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

670. The Rural School Curriculum. Five credit hours. Spring Quarter. Mr. Brim.

The fundamental nature of the curriculum problem. The present approved standards for the elementary curriculum. Desirable differentiation in curricula for urban and rural elementary schools. The course will seek to offer concrete and practical help in reorganizing the curriculum in rural elementary schools in terms of rural school conditions and rural children's experience and needs.

This course is not open to students who have credit for Principles of Education 308 or 377 or 513.

FOR GRADUATES

Prerequisite for Graduate Work: Students who desire to become candidates for advanced degrees, with a major in the principles of education, must have a total credit equivalent to thirty Quarter hours of work in educational subjects, philosophy or psychology.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

802-803-804. Special Problems in Educational Theory. Three credit hours. Autumn, Winter, Spring Quarters. Mr. Bode, Mr. Thayer.

811-812-813. Special Problems in Secondary Education. Three credit hours. Autumn, Winter, Spring Quarters. Mr. Thayer.

814-815-816. Special Educational Problems in the Social Studies in the Secondary Schools. Three credit hours. Autumn, Winter, Spring Quarters. Mr. Pahlow.

*817. Special Educational Problems in the English Studies in the Secondary Schools. Three credit hours.

821-822. Special Educational Problems in the Physical Sciences in the Secondary Schools. Three credit hours. Autumn and Spring Quarters. Mr. Twiss.

Studies in the history, methods, problems, influence, scope, and future development of the physical sciences. It is adapted to the needs of students specializing in principles of education or in any of the physical sciences.

825-826-827. Special Problems in Elementary Education. Three credit hours. Autumn, Winter, Spring Quarters. Mr. Brim, Mr. Landsittel.

The distinctive elements of American culture and the responsibilities they impose upon the agencies of education.

835. The Teaching and Supervision of American History in the Secondary Schools. Three credit hours. Winter Quarter. Three lectures each week. Prerequisite, Principles of Education 700, or permission of the instructor. Mr. Pahlow.

This course is planned for teachers and supervisors. It will survey the main currents of American social and political development with special reference to the selection and organization of materials for curriculum making and classroom procedure. It will study the principles which should determine the organization and teaching of American history and will critically survey recent experiments in history teaching.

This course is not open to students who have credit for Principles of Education 366 or 367 or 703 or 838 or 839.

851-852-853. Major Research. Three or more credit hours. Autumn, Winter, Spring Quarters. Mr. Bode and others.

Primarily intended for students offering theses for advanced degrees.

By permission of the head of the department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

PSYCHOLOGY

Office, Education Building

PROFESSORS ARPS, WEISS, BURTT, GODDARD, AND MAXFIELD, ASSISTANT PROFESSORS PRESSEY, ROGERS, WILLIAMS, TOOPS, AND RENSHAW, MR. ESPER, MRS. PRESSEY, MR. REXROAD

The courses offered in psychology fall into five general groups. The following approximate sequences are suggested for the guidance of students desiring a consistent program giving preparation in one of these fields. It is strongly urged, however, that students contemplating such work consult with the department as early as possible with

* Not given in 1926-1927.

reference to the arrangement of courses. This is particularly the case with graduate students. Thus in planning for a Doctor's degree a reading knowledge of French and German should be acquired during the undergraduate period.

I. Normal Psychology: 601-602-603, 608, 621, 623, 629, 630, 645, 650.

II. Educational Psychology—preparation for psychological work in the schools: 608, 610, 613, 614, 615, 616, 611, 628, 651, or 652, 650.

III. Abnormal and Clinical Psychology: 607, 608, 621, 611, 609, 634, 616, 617, 641, 642, 650.

IV. Applied Psychology: 635, 636, 608, 639, 637, 638, 634, 650.

V. Comparative Psychology: 401-402, 655, 656, 657, 658, 650.

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in psychology in addition to any prerequisites stated in the description of the courses. Course 624-625 requires a fundamental course in physics.

601. Experimental Psychology. Three credit hours. Autumn Quarter. One lecture and two laboratory periods each week. Mr. Weiss, Mr. Renshaw.

A systematic training course in the psychological method.

602. Experimental Psychology. Three credit hours. Winter Quarter. One lecture and two laboratory periods each week. Prerequisite, Psychology 601. Mr. Weiss, Mr. Renshaw.

This course is a continuation of Psychology 601.

603. Experimental Psychology. Three credit hours. Spring Quarter. One lecture and two laboratory periods each week. Prerequisite, Psychology 602. Mr. Weiss, Mr. Renshaw.

This course is a continuation of Psychology 602.

605. Physiological Psychology. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Goddard.

The aim of this course is to give a consistent picture of the physical basis of mind. It uses the important facts of the anatomy and physiology of the central and autonomic nervous systems and the more generally accepted theories of nerve functions and their correlations with mental processes. It is adapted to the needs of medical students and those taking courses in abnormal psychology and the mentally deficient child.

606. Advanced Physiological Psychology. Three credit hours. Winter Quarter. Three lectures each week. Prerequisite, Psychology 605 or permission of the instructor. Mr. Goddard.

This course will deal with the larger problems of the dependence of mental phenomena upon physiological processes such as: the emotions and the sympathetic system; temperament and the endocrines; consciousness and the circulation; nerve activity without consciousness; effect of unusual physiological conditions (e. g., produced by fatigue, alcohol, syphilis or other toxins) upon various mental processes.

607. Genetic Psychology. Five credit hours. Spring Quarter. Five lecture hours each week. Lectures, recitations, and reports. Mr. Williams.

This course is designed to present the facts of mental development and their significance. Topics considered are: individual development, particularly with reference to the development of the nervous system; inheritance of mental traits; innate tendencies, their characteristics, description, and modification; play; mental states, their physiological basis and development with growth and training; moral and religious development; physical development; methods of child study; exceptional children (observation of atypical children in city and state institutions).

608. Educational Statistics: Elementary. Three credit hours. Autumn Quarter. Two lectures and one two-hour laboratory period each week. Mr. Toops.

A basic statistical course for students intending to conduct major or minor research. Frequency distributions, methods of measuring central tendencies and variability; construction of graphs and charts; interpretation of results in terms of probability; simple treatment of correlation.

This course is not open to students who have credit for School Administration 613 or 643.

609. The Exceptional Child. Three credit hours. Spring Quarter. Three lecture hours each week. Lectures, reports, clinics, and visits to public institutions. Prerequisite, fifteen hours of psychology or ten hours of psychology and five hours of professional educational subjects or sociology. Mr. Maxfield.

Individual differences among children with respect to mental, physical, and social traits. The social and pedagogical significance of talent and defect. Consideration of gifted children, special ability, special disability, delinquency, speech defect, and conduct disorder. Minor consideration of mental deficiency. Emphasis will be placed upon the psychology of the exceptional child as a foundation for educational classification and treatment.

610. Adolescence. Three credit hours. Autumn Quarter. Three lectures each week. Mrs. Pressey.

A study of the outstanding characteristics of the adolescent boy and girl, the educational and social problems arising at this period, and means for dealing with these problems.

611. The Mentally Deficient Child. Three credit hours. Autumn Quarter. Three lecture hours each week. Lectures, reports, clinics, and visits to public institutions. Prerequisite, fifteen hours of psychology or ten hours of psychology and five hours of professional educational subjects or sociology. Mr. Maxfield.

The varieties and grades of mental deficiency, including the backward child of the schools and the distinctly feeble-minded. Consideration of mental deficiency and defect for purposes of educational treatment and social disposition. The psychology of feeble-mindedness; types, degrees, causes, and consequences. Minor consideration of the special pedagogy of backward children.

612. Educational Statistics: Intermediate. Three credit hours. Winter Quarter. Two lectures and one two-hour laboratory period each week. Prerequisite, Psychology 608 or School Administration 613 or 643 or equivalent. Mr. Toops.

Fuller treatment of correlation: regression coefficients and equations; partial and multiple correlation; uses of normal probability curve; reliability and validity of test data; comparable measures.

This course is not open to students who have credit for School Administration 644.

613. Mental and Educational Tests. Three credit hours. Autumn Quarter. Three lecture hours each week. Lectures, readings, classroom demonstrations, and special reports. Mr. Pressey.

A brief course covering the use of tests of both ability and school work. The course will begin with a discussion of tests in arithmetic, reading and history, and other school subjects, will then take up tests of intelligence and will conclude with a general discussion of the handling of test scores and of the use to be made of these scores in dealing with practical problems.

†**614. Problems of Test Work.** Three credit hours. Three lectures each week. Lectures, readings in educational periodicals, discussion. Prerequisite, Psychology 613 or its equivalent, or (by permission of the instructor) extended experience in the use of tests. Mr. Pressey.

Reliability and validity of tests. Interpretation of scores. Statement of results; graphing. Criteria for selecting tests; organization of test work; records; application of test results in dealing with educational problems. The work will be illustrated throughout by use of standard mental and educational tests. Students having data of their own are urged to make use of this material in working out application of the principles discussed.

615. Laboratory in Tests and Educational Diagnosis. Three credit hours. Winter Quarter. Six laboratory hours each week. Prerequisite, Psychology 613 or permission of the instructor. Mrs. Pressey.

Practice in the giving and scoring of tests and in the use of tests in dealing with educational problems. Special attention will be given to use of test materials in the diagnosis of special disabilities and difficulties in school work.

616. Individual Mental Tests. Two credit hours. One Quarter. Autumn and Winter. Two laboratory periods each week. Lectures, reports, laboratory, demonstrations, and individual testing. Prerequisite, fifteen hours of psychology or ten hours of psychology and five hours of professional educational subjects or sociology. Mr. Goddard, Mr. Maxfield, and assistants.

Practice on the technique of the Binet-Simon scale for measuring intelligence. Brief historical and descriptive treatment of the Binet scale, followed by intensive training in the practical Binet testing of school children.

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† Not given during the academic year, 1926-1927.

617. Elementary Psychological Clinic. Two credit hours. One Quarter. Winter and Spring. Two laboratory periods each week. Lectures, reports, demonstrations, laboratory and individual testing. Prerequisite or concurrent, Psychology 616. Mr. Goddard, Mr. Maxfield, and assistants.

Advanced study and application of the Binet-Simon scale for measuring intelligence. Psychology of Binet tests with study of the statistical principles involved in the construction of the scale. Descriptive study of the various modifications of the Binet-Simon scale. Intensive laboratory training in advanced Binet testing, with special emphasis on the diagnostic use of the test and qualitative interpretation of results.

618. Clinical Mental Tests. Two credit hours. One Quarter. Autumn and Spring. Two laboratory periods each week. Lectures, laboratory and individual testing. Prerequisite, fifteen hours of psychology. Mr. Maxfield and assistants.

Descriptive and practical laboratory study of standardized diagnostic mental tests. Intensive laboratory training in the application of mental tests for individual examination, with special reference to tests of proved diagnostic value.

619. Advanced Psychological Clinic. Two to four credit hours. One Quarter. Autumn, Winter, Spring. Two laboratory periods each week. Lectures, reports, laboratory and individual case studies. Prerequisites, Psychology 617 and 618, or permission of the instructor. May be taken for one or two Quarters with a maximum credit of four hours. Mr. Goddard, Mr. Maxfield, and assistants.

Theory and practice of mental diagnosis. Descriptive and practical study of the clinical syllabus and case-taking, including family history, personal history, school history, social history and so on. Combination mental diagnosis based on the application and interpretation of various mental tests for general intelligence, special ability and disability, and so on. Training in the preparation of clinical reports.

NOTE: A student may profitably receive the special training which this course gives for a second Quarter. Repetition does not involve repetition of content, but additional practice in clinical diagnosis.

620. Practicum in Mental Diagnosis. Two credit hours. One Quarter. Autumn, Winter, Spring. Assignments equivalent to two laboratory periods each week. Prerequisite, Psychology 619 or permission of the instructor (students are advised to consult instructor before registering). May be taken for one or two Quarters with a maximum credit of four hours. Mr. Goddard, Mr. Maxfield, and assistants.

Applied clinical diagnosis. Students will engage in actual diagnostic service, under the supervision of the instructor. Cases will be studied in the laboratory and in the nearby public schools and institutions. Special training in the diagnosis of borderline, psychopathic and doubtful cases. Advanced training in the preparation of clinical reports.

NOTE: A student may profitably receive the special training which this course gives for a second Quarter. Repetition does not involve repetition of content but additional practice in clinical diagnosis.

621. Social Psychology. Three credit hours. Winter Quarter. Three lecture hours each week. Mr. Arps.

The nature and variety of innate tendencies; the relation of these tendencies to acquired behavior and social control; the development of personality.

622. The Psychology of the Delinquent Child. Three credit hours. Spring Quarter. Three lecture hours each week. Lectures, reports, and visits to the Bureau of Juvenile Research. Prerequisite, fifteen hours of psychology or ten hours of psychology and five hours of professional educational subjects or sociology. Mr. Maxfield.

The relation of mental deficiency to social maladjustment. Treatment of problems of mental abnormality arising in clinical work, in juvenile courts, institutions for delinquents, and in the work of probation officers, attendance supervisors, visiting teachers, and social workers.

***623. Folk Psychology.** Three credit hours. Autumn Quarter. Three lectures each week. Mr. Esper.

A consideration of the psychological factors involved in the various forms of group behavior.

624. Psychology of Vision. Five credit hours. Spring Quarter. Three lectures each week. Given biennially. Prerequisite, Psychology 602. Mr. Williams.

Production, measurement and control of photic stimuli and measurements of the variations in their effectiveness as determined by physical and physiological factors. The work will consist in part of lecture-demonstrations and experiments and in part of a critical study of the reports of original authors. Special attention will be given to the facts and hypotheses of color-vision and to visual problems in industry.

628. The Learning Process. Three credit hours. Spring Quarter. Three lectures each week. Lectures, readings in monographs and journals, discussions. Mr. Pressey.

An advanced course in educational psychology, dealing with certain especially important problems in the field, such as the control of the learning process, memory and forgetting, transfer of training, fatigue, with emphasis upon the more elaborate types of learning such as are seen in school work. Especial attention will be paid to recent experimentation and theories concerning the learning process.

629. Advanced Psychology. Five credit hours. Winter Quarter. Five lectures each week. Miss Rogers.

The purpose of this course is to give a larger background to the advanced student of psychology, with respect to the development of psychology as a science, emphasizing the relations of psychology to other disciplines, especially the sciences, and with respect to the evolutions of some of its fundamental concepts, as consciousness and behaviorism.

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* Not given in 1926-1927.

630. Psychology of Feeling and Emotion. Five credit hours. Spring Quarter. Five lectures each week. Prerequisite, Psychology 629. Miss Rogers.

A study of the various theories of feeling and emotion and the fundamental relations of emotion to instincts. The relations between these subjects and social behavior will be emphasized.

631. Theory of Intelligence. Three credit hours. Winter Quarter. Three lecture hours each week. Prerequisite, fifteen hours of psychology or ten hours of psychology and five hours of professional educational subjects. Mr. Maxfield.

Nature of intelligence, current and historical concepts. Psychology of intelligence; physical and physiological correlates. Distribution and growth of intelligence. Critical study of the "Intelligence Quotient." Mental age, mental level, mental type, mental function.

634. Criminal and Legal Psychology. Five credit hours. Winter Quarter. Five lectures each week. Mr. Burtt.

Psychological factors in the determination of reliability of testimony; the technique of detecting crime and falsehood; responsibility; the relation of crime to mental defect; the prevention of crime through environmental factors and heredity.

635. Psychology of Advertising. Three credit hours. One Quarter. Autumn and Spring. Three lectures each week. Mr. Burtt.

The psychological principles involved in effective advertising, notably attention, memory and action, with the contributory factors of association, feeling, instinct, suggestion, and reasoning.

636. Advertising Laboratory. Three credit hours. Winter Quarter. Six laboratory hours each week. Prerequisite, Psychology 635. Mr. Burtt.

General and special problems illustrating the application of laboratory methods and the treatment and use of experimental data in the field of advertising.

637. Industrial Psychology. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Burtt.

The application of psychology to problems of industrial learning, adjustment of technical to mental factors, monotony, fatigue, and environmental conditions.

638. Industrial and Vocational Psychology Laboratory. Three credit hours. Spring Quarter. Two three-hour laboratory periods each week. Prerequisite, permission of the instructor. Mr. Burtt.

Laboratory work in the application of psychology to industrial and vocational problems, with especial emphasis on the development of mental tests for hiring employees. Practice in the devising and standardizing of occupational tests; obtaining and evaluating production ratings; correlation of ratings and tests; interpretation of results from the standpoint of vocational selection or guidance. A portion of the work of the course is frequently done in local business and industrial plants.

639. Psychology and Personnel. Three credit hours. Winter Quarter. Three lectures each week. Mr. Burtt.

The application of psychology to problems of personnel. Selection and placement of employees by tests of intelligence and special ability. Trade tests, job analysis, and rating scales.

This course is not open to students who have taken Psychology 637 prior to 1923-1924.

640. Educational and Vocational Guidance. Three credit hours. Winter Quarter. Mr. Toops.

A course dealing with the technique of evaluating psychological and related factors as a basis for making educational and vocational recommendations to individuals. The place of vocational and educational tests, previous record, and personality traits in determination of choice of occupation or course of study.

This course is not open to students who have credit for Psychology 417.

641. Abnormal Psychology. Five credit hours. Winter Quarter. Five lectures each week. Lectures, recitations, and clinics. Mr. Goddard.

The abnormal mental phenomena—viz., disorders of perception, association, memory, affection, judgment, action, volition, and personality, with especial emphasis on their relation to the respective normal phenomena. The grouping of these disorders into the syndromes exhibited in the main types of insanity.

***642. Psychopathology.** Three credit hours. Spring Quarter. Three lectures each week. Lectures, recitations, and reports. Prerequisite, Psychology 641. Mr. Goddard.

This course deals with the unusual (so-called pathological) manifestations of mind. Beginning with a consideration of subconscious phenomena—sleep, dreams, hypnosis, automatic writing, etc., there will be discussed: phobias, suggestion, the psychological aspects of hysteria, and multiple personality, psychasthenia, neurasthenia, and other disorders of personality.

644. Human Motives and Incentives. Three credit hours. Spring Quarter. Three hours each week. Lectures, recitations, and assigned readings. Mr. Toops.

The psychological bases of initiation and improvement of work. The role of instinct, habit, custom, and tradition, rationalization and psychopathy in motivation. The incentive values of self-ratings, competition, punishment, and such rewards as money, bonuses, participation, and promotion, in relation to the capacities of individuals.

645. History of Psychology. Five credit hours. Winter Quarter. Five lectures each week. Prerequisites, Psychology 629 and 630 or permission of instructor. Mr. Williams.

The course aims to view modern psychological problems in the light of their historical antecedents. The development of various theories such as those of sensation, attention, space perception, and emotion will be traced from earliest times to the present. As far as possible assignments will involve reference to original sources.

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* Not given in 1926-1927.

646. Principles of Human Behavior. Three credit hours. Spring Quarter. Three lectures each week. Prerequisite, sixteen hours in psychology. Mr. Weiss.

A study of the development of theories of human behavior and a consideration of the simplest assumptions necessary and sufficient to explain the facts of human behavior as dependent on social and biological conditions.

***647. Theoretical Psychology.** Three credit hours. Spring Quarter. Three lectures each week. Prerequisite, sixteen hours in psychology. Mr. Weiss.

Lectures and assigned readings bearing on the evolution of psychological theory in its relation to the physical and the social sciences.

***648. Psychology of Language.** Three credit hours. Winter Quarter. Three lectures each week. Mr. Esper.

The nature of the speech reaction, the development of speech in the child, the types of linguistic categories, and the psychological factors in linguistic change.

This course is not open to students who have credit for Psychology 633.

***649. Psychology of Language Laboratory.** Two credit hours Spring Quarter. Four laboratory hours each week. Prerequisite, Psychology 648. Mr. Esper.

A training course in the use of apparatus and methods for the experimental investigation of language behavior.

650. Minor Problems. One or more credit hours. Autumn, Winter, Spring Quarters. Prerequisite, sixteen hours in psychology. All instructors.

Investigation of minor problems in the various fields of psychology.

By permission of the head of the department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

651. Psychology of the Elementary School Subjects. Three credit hours. Winter Quarter. Three lectures each week. Prerequisite, Psychology 407 or 607. Mrs. Pressey.

An analysis of the specific psychological processes involved in arithmetic, reading, writing, and other elementary school subjects, with consideration of the conditions which promote learning in each subject, and examination of textbooks and methods from this point of view.

This course is not open to students who have credit for Psychology 410.

652. Psychology of High School Subjects. Three credit hours. Spring Quarter. Three lectures each week. Prerequisite, Psychology 407 or 607. Mr. Pressey.

An analysis of the specific psychological processes involved in algebra, language,

* Not given in 1926-1927.

science, and other high school subjects, with consideration of the conditions which promote learning in each subject, and examination of textbooks and methods from this point of view.

This course is not open to students who have credit for Psychology 410.

†653. Special Response Categories. Three credit hours. Three lectures each week. Prerequisite, Psychology 646. Mr. Weiss.

An analysis of the more complex forms of human behavior. This course is a continuation of Psychology 646.

654. Advanced Statistics. Three credit hours. Spring Quarter. Two lectures and one two-hour laboratory period each week. Prerequisite, Psychology 612 or School Administration 644 or equivalent. Mr. Toops.

Special cases in correlation; non-linear regression; straight lines of best fit; construction of criteria; elementary probability; random sampling; derivation of commonly used equations; critical readings; construction of tables and graphs to meet the research needs of individual students.

655-656. Comparative Psychology. Three credit hours. Winter and Spring Quarters. Three lectures each week. Prerequisite, Psychology 401-402 or 403-404. Mr. Rexroad.

Lectures and collateral reading on: principles of behavior and results of experimental investigations of the sensational and perceptual responses of animals at various levels of development; and of the organization of responses of animals at various levels of development with special reference to instinctive behavior and the formation of motor visceral and symbolic habits.

This course is not open to students who have credit for Psychology 627.

657-658. Comparative Psychology Laboratory Training Course. Three credit hours. Winter and Spring Quarters. One lecture each week and laboratory periods to be arranged. Zoology 605-606-607 is recommended as a preliminary or concurrent course. Mr. Rexroad.

Methods and technique of observation and control of sensori-motor responses and habit formation of vertebrate animals. Facilities are provided for the needs of those students who desire to continue in special research.

659. Adult Testing Laboratory. Three credit hours. Autumn Quarter. Two three-hour laboratory periods each week. Prerequisite, ten hours of psychology. Mr. Toops.

A course designed for students who are preparing for positions in vocational guidance or personnel work in universities and those interested in the achievement of adults.

The giving, scoring and interpretation of tests of university entrants.

Reading tests and tests of special capacities of adults. Planning a testing program for adults. Theories of adult testing. The content of the course will vary somewhat from year to year.

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† Not given during the academic year, 1926-1927.

662. The Elementary and Pre-School Child. Three credit hours. Winter Quarter. Three lectures each week. Prerequisite, an acceptable course in educational psychology. Mrs. Pressey.

This course will present the elements of child nature, individual differences and development in children from infancy till adolescence. The course will be especially adapted to the needs of teachers and of others who have constant contact with children.

701. Proseminary in Educational Psychology. Two credit hours. Autumn Quarter. One two-hour discussion each week. Prerequisites, an acceptable course in educational psychology and the permission of the instructor. Only school people in active service will be admitted. Mrs. Pressey.

This course is offered exclusively for teachers in service. It will consist of lectures and readings upon one or more topics of importance in educational psychology. These topics will vary from year to year according to the needs of the group. Each teacher will be expected to work out some minor problem having to do with the main topic of the course.

FOR GRADUATES

Prerequisite for Graduate Work: A student who desires to become a candidate for an advanced degree, with psychology as a major subject, must previously have completed the equivalent of at least two years of psychology; or he must have completed one year of psychology and one year of college work in one of the following subjects: philosophy, mathematics, physiology, physics, zoology, sociology.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Major Research. Three or more credit hours. Autumn, Winter, Spring Quarters. All instructors.

Primarily intended for students offering theses for advanced degrees.

By permission of the head of the department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

803. Seminary in Psychology. Two credit hours. Autumn, Winter, Spring Quarters.

805. Contemporary Psychologal Literature. One credit hour. Autumn, Winter, Spring Quarters. Mr. Renshaw.

808. Psycho-Analysis. Two credit hours. Autumn Quarter. Two lectures each week. Mr. Goddard.

This course will deal with the history and development of psycho-analysis; the theories of Freud, Jung, and others. Current views of the unconscious together with discussion of the neurological basis for such of the concepts as may be thus explained; the method free association and the interpretation of dreams.

PUBLIC HEALTH

Office, Hamilton Hall

PROFESSORS HAYHURST AND McCAMPBELL, ASSISTANT PROFESSORS SELBERT AND WILSON, MR. VAN BUSKIRK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

601. Personal Hygiene. Three credit hours. Winter Quarter. Three lectures or recitations each week. Prerequisite, first two years of course preliminary to Medicine or five credit hours in college biological science. A previous course in chemistry is recommended. Mr. Hayhurst.

This course aims, in a somewhat technical manner, to point out the principles for maintaining personal health and efficiency.

602. Public Health Problems. Three credit hours. One Quarter. Autumn and Spring. Three recitations each week. Prerequisite, first two years of course preliminary to Medicine or five credit hours in college biological science. A previous course in chemistry and physics is strongly recommended. Mr. Hayhurst.

A resume of theories and discoveries pertaining to the causes and prevention of disease. An elementary consideration of the public health aspects of such problems as food supplies, milk, water, sewage and refuse disposal, air and ventilation, communicable diseases, quarantine, maternity and infant welfare, housing and school hygiene, camp and rural sanitation, public service hygiene, tuberculosis, cancer, nostrums, and quackery, mental and industrial hygiene, vital statistics, health education and health administration.

603. Industrial Hygiene. Three credit hours. Winter Quarter. Three recitations each week. Prerequisite, first two years of course preliminary to Medicine or five credit hours in college biological science. A previous course in chemistry and physics is strongly recommended or that it be preceded by Public Health 602. Mr. Hayhurst.

This course considers the hygiene of work and as such deals with the principles which underlie working efficiency, maximum production and the avoidance of loss of time due to ill-health. The course consists of didactic work, lectures and demonstrations covering the various health hazards which exist in connection with occupations such as fatigue, inactivity, industrial infections, dust, faulty air-conditions and illumination, temperature extremes, poisons, abnormal atmospheric pressures, electrical hazards, etc. The methods of control, including governmental supervision, organization of industrial health services, physical examinations, the occupational diseases and compensation matters are included.

604. Preventive Medicine. Two credit hours. Autumn Quarter. Two recitations or demonstrations each week. Prerequisite, first three years of the curriculum in Medicine. Mr. Wilson.

Channels of infection and epidemiology. Water supplies, sewage and refuse disposal. Disinfection. Ventilation and heating. Principles of public health measures.

FOR GRADUATES

Prerequisite for Graduate Work: A student who desires to become a candidate for the Master's degree in Public Health must be (a) a graduate of a Class "A" medical school, or must hold (b) the degree of Bachelor of Arts or an equivalent degree from an acceptable institution, in which case he must also have completed the following preliminary subjects: chemistry (general and qualitative), 15 credit hours; physics, 10 credit hours; zoology (elementary), 10 credit hours; comparative anatomy (vertebrate), 5 credit hours; physiology, 10 credit hours; and bacteriology (general and pathogenic), 11 credit hours.

As a minimum qualification for the study of a graduate course in public health, the student must be majoring in a biological science in which case he may elect, as a minor, Public Health 801, 802, 803, or 809, or he must previously have completed the equivalent of 12 credit hours in science, of which at least 6 must have been in biological science, in which case he may elect Public Health 801, 802, 803, or 808. In the case of a student taking a major in education or sociology, Public Health 801, 802, 803, and 808 may be elected, with the permission of the instructor in charge.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Personal Hygiene. Three credit hours. One Quarter. Autumn, Winter, Spring. Prerequisite or concurrent, Public Health 601. Mr. Hayhurst.

The applied anatomy and physiology of the human being with particular attention to questions of toleration, adaptation, results of faulty habits, tests of normality and abnormality, common afflictions and their avoidance, impairments and functional re-education, general prophylaxis, first aid and emergency treatments; mental hygiene.

802. Public Health Problems. Four credit hours. One Quarter. Autumn, Winter, Spring. Prerequisite or concurrent, Public Health 602. Mr. Hayhurst.

Efficiency of public health measures, organization of national, state, and local health departments, sanitary law and legal powers, and responsibilities of health officers. Current problems in hygiene and sanitation.

803. Industrial Hygiene. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Prerequisite or concurrent, Public Health 603. Mr. Hayhurst.

The industries, trades, and callings of chief hygienic import; the industrial health hazards technically considered; the occupational diseases; the general means of hygienic control and prevention. Includes laboratory, demonstrations, and inspection trips.

***807. Demography.** Two credit hours. One Quarter. Autumn, Winter, Spring. Open only to students who are majoring in the curriculum in Public Health.

Vital, social, and sanitary statistics.

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* Not given in 1926-1927.

808. **Social Service and Public Health Nursing.** Two credit hours. One Quarter. Autumn, Winter, Spring. For prerequisite see introductory statement. Mrs. Selbert.

Preventable diseases discussed from their social aspects. Relation between social science and preventive medicine. Existing agencies and principles involved in dealing with medico-sociological problems.

809. **Communicable Diseases.** Four credit hours. One Quarter. Autumn, Winter, Spring. For prerequisite see introductory statement. Mr. McCampbell, Mr. Wilson.

813. **Public Health: Laboratory.** Four credit hours. One Quarter. Autumn, Winter, Spring. One lecture or conference and eight laboratory hours each week. Open only to students who are majoring in the curriculum in Public Health. Mr. Van Buskirk.

Methods and examinations employed in diagnosis of communicable diseases.

814. **Public Health: Laboratory.** Four credit hours. One Quarter. Autumn, Winter, Spring. One lecture or conference and eight laboratory hours each week. Open only to students who are majoring in the curriculum in Public Health. Prerequisite, Public Health 813. Mr. Van Buskirk.

Water, food, and drug analyses.

815. **Public Health: Laboratory.** Four credit hours. One Quarter. Autumn, Winter, Spring. One lecture or conference and eight laboratory hours each week. Open only to students who are majoring in the curriculum in Public Health. Prerequisite, Public Health 814. Mr. Van Buskirk.

Laboratory inspection methods of water, sewage, milk, food, and drug products.

816. **Major Research.** Three to six credit hours. One Quarter. Autumn, Winter, Spring. For students who are majoring in Public Health and offering theses for the Master's degree. Prerequisite or concurrent, Public Health 801, 802, or 803. All instructors.

817. **Medical Aspects of Public Health Engineering.** Two credit hours. Spring Quarter. Recitations and demonstrations. Open only to students who are majoring in the curriculum in Public Health. Prerequisites, Civil Engineering 602 and 703. Mr. Van Buskirk.

The preventive medical aspects of engineering procedures.

This course is not open to students who have credit for Public Health 811 or 812.

RHETORIC AND ENGLISH LANGUAGE

(See English)

ROMANCE LANGUAGES AND LITERATURES

Office, 104 Hayes Hall

PROFESSORS ROCKWOOD, HENDRIX, MOORE, AND HAVENS, ASSISTANT PROFESSORS HAMILTON, GUTIERREZ, FOURE, ANIBAL, AND RUSSELL, MR. WHATLEY

FRENCH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Acceptable courses in French in addition to any prerequisites stated in the description of the courses.

601. French Literature of the Seventeenth Century (1600-1660). Five credit hours. One Quarter. Autumn and Spring. Five lectures each week. Lectures, collateral reading, and reports. The class is limited to fifty students. Mr. Rockwood, Mr. Havens.

The principal literary movements of the age: formation of the school of 1660. The Libertines, growth of French comedy and tragedy, The Précieuses, The French Academy will be discussed. Selected works of Malherbe, De Viau, Descartes, Balzac, and Corneille will be read.

602. French Literature of the Seventeenth Century (1660-1700). Five credit hours. Winter Quarter. Five lectures each week. Lectures, collateral reading, and reports. The class is limited to fifty students. Mr. Rockwood.

The school of 1660. Quarrel of the Ancients and the Moderns. Selected works of Molière, Racine, Pascal, La Bruyère, La Fontaine, La Rochefoucauld will be read.

603. French Literature of the Nineteenth Century (1800-1850). Five credit hours. One Quarter. Autumn and Spring. Five lectures each week. Mr. Moore.

Chateaubriand, Mme. de Staël, Balzac, de Musset, de Vigny, Hugo, Mérimée.

604. French Literature of the Nineteenth Century (1851-1900). Five credit hours. Winter Quarter. Five lectures each week.

Dumas fils, Augier, Flaubert, Daudet, Maupassant, Sardou, Rostand, Maeterlinck, and others.

605. French Literature of the Fifteenth and Sixteenth Centuries. Three credit hours. Autumn Quarter. Three lectures each week. Given biennially. Prerequisite, French 601-602 or 603-604. Mr. Moore.

Villon, Rabelais and Montaigne.

607. French Literature of the Eighteenth Century (1700-1750). Three credit hours. Autumn Quarter. Three lectures each week. Given

biennially, alternating with French 605. Prerequisite, French 601-602 or 603-604. Mr. Havens.

Rapid reading, with lectures and reports. Fontenelle, Bayle, Crébillon, Voltaire, Montesquieu, Marivaux, and others.

608. **French Literature of the Eighteenth Century (1750-1789).** Three credit hours. Winter Quarter. Three lectures each week. Prerequisite, French 601-602 or 603-604. Mr. Havens.

Rapid reading, with lectures and reports. Voltaire, Rousseau, Diderot, Beaumarchais, and others.

*609. **The French Novel to 1850.** Three credit hours. Autumn Quarter. Three lectures each week. Given biennially, alternating with French 611-612. Prerequisite, French 601-602 or 603-604. Mr. Havens.

Rapid survey of the French novel during the sixteenth, seventeenth, and eighteenth centuries and the first half of the nineteenth century. Mme. de Staël, Chateaubriand, George Sand, Hugo, and Balzac. Lectures, reports, and collateral reading.

*610. **The French Novel, 1850 to the Present Day.** Three credit hours. Winter Quarter. Three lectures each week. Given biennially, alternating with French 611-612. Prerequisite, French 601-602 or 603-604. Mr. Havens.

Flaubert, Maupassant, Zola, Daudet, France, Bazin, Loti, and others. Lectures, reports, and collateral reading.

611. **The Comedy of Manners in the Nineteenth Century (1800-1880).** Three credit hours. Winter Quarter. Three lectures each week. Given biennially, alternating with French 609-610. Prerequisite, French 601-602 or 603-604. Mr. Rockwood.

La Pièce à Thèse, La Pièce Bien Faite, Dumas fils, Augier, Scribe, Sardou. Rapid reading with lectures and reports.

612. **The Comedy of Manners in the Nineteenth Century (1880-1922).** Three credit hours. Spring Quarter. Three lectures each week. Given biennially, alternating with French 609-610. Prerequisite, French 601-602 or 603-604. Mr. Rockwood.

Le Theatre Libre, Becque, Cure, Hervieu, Lavedan, Donnay, Bernstein, Bataille, Guitry. Rapid reading with lectures and reports.

613. **History of French Literature (942-1660).** Three credit hours. Winter Quarter. Three lectures each week. Prerequisites, French 621 and at least one course in French literature. Given biennially, alternating with French 625-626. This course is conducted in French. Mr. Fouré.

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* Not given in 1926-1927.

614. **History of French Literature (1660-1922).** Three credit hours. Spring Quarter. Three lectures each week. Prerequisites, French 621 and at least one course in French literature. Given biennially, alternating with French 625-626. This course is conducted in French. Mr. Fouré.

623. **Intermediate French Conversation and Composition.** Three credit hours. One Quarter. Autumn and Winter. Three recitations each week. Prerequisite, permission of the instructor. This course is conducted in French. It is limited to twenty students. Mr. Fouré.

624. **Intermediate French Conversation and Composition (Continued).** Three credit hours. One Quarter. Winter and Spring. Three recitations each week. Prerequisites, French 623, and permission of the instructor. This course is conducted in French. It is limited to twenty students. Mr. Fouré.

*625. **Explication de Textes.** Three credit hours. Winter Quarter. Three recitations each week. Given biennially, alternating with French 613-614. Prerequisites, French 623, 624, and a course in French literature. This course is conducted in French. Mr. Fouré.

The course aims to introduce the student to a method of literary appreciation based upon a critical study of well selected texts representing the main characteristics of each writer. Examples will be taken from seventeenth and eighteenth century authors.

*626. **Explication de Textes (Continued).** Three credit hours. Spring Quarter. Three recitations each week. Given biennially, alternating with French 613-614. Prerequisite, French 623, 624, and a course in French literature. This course is conducted in French. Mr. Fouré.

Selections from the nineteenth century and contemporary authors.

627. **French Phonetics.** Three credit hours. One Quarter. Winter and Spring. Prerequisite, six Quarters of collegiate French or the equivalent, the consent of the department, and permission of the instructor. Required of all students desiring the department recommendation as a teacher of French. This class is limited to twelve.

The formation of French sounds. Lectures, with exercises in the use of the symbols of the International Phonetic Association. A systematic study of the rules of French pronunciation. Careful drill in the reading of French. Designed for advanced students who expect to teach French.

628. **Review of French Syntax.** Three credit hours. Autumn Quarter. Open to graduate students who have had six Quarters of col-

* Not given in 1926-1927.

legiate French or the equivalent with a grade not less than "C." Mr. Hamilton.

A careful elucidation of French grammar, with composition to illustrate. Designed for advanced students who expect to teach French.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 740.

ITALIAN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Introductory course in Italian in addition to any prerequisites stated in the description of the courses.

601. Modern Italian Literature (1800-1850). Five credit hours. Winter Quarter. Five recitations each week. Mr. Moore.

Foscolo, Manzoni, Pellico, Leopardi.

602. Modern Italian Literature (1851-1900). Five credit hours. Spring Quarter. Five recitations each week. Mr. Moore.

Rovetta, Carducci, Giacosa, Fogazzaro.

607. Italian Literature of the Renaissance. Three credit hours. Autumn Quarter. Three recitations each week. Given biennially, alternating with Italian 611. Prerequisite, Italian 602 or the permission of the instructor. Mr. Moore.

Boiardo, Ariosto, Pulci, Machiavelli. Lectures, collateral reading, and reports.

608. Italian Literature of the Renaissance (Continued). Three credit hours. Winter Quarter. Three recitations each week. Given biennially, alternating with Italian 612. Prerequisite, Italian 602 or the permission of the instructor. Mr. Moore.

Bandello, Il Lasca, Castiglione, Cellini, Tasso. Lectures, collateral reading, and reports.

609. Survey of Italian Literature to 1400. Three credit hours. Winter Quarter. Three lectures each week. No prerequisites, and no knowledge of a foreign language required. Mr. Moore.

English translations of Dante, Petrarch, Boccaccio. Lectures, readings, and reports will be in English.

610. Survey of Italian Literature (1400-1900). Three credit hours. Spring Quarter. Three lectures each week. No prerequisites, and no knowledge of a foreign language required. Mr. Moore.

English translations of Ariosto, Machiavelli, Cellini, Castiglione, Tasso, Manzoni, and others. Lectures, readings, and reports will be in English.

*611. **Dante's Life and Works.** Three credit hours. Autumn Quarter. Three lectures each week. Alternates biennially with Italian 607. Prerequisite, Italian 602 or the permission of the instructor. Mr. Moore.

Reading of the Vita Nuova and The Inferno, Cantos 1-16.

*612. **Dante's Life and Works (Continued).** Three credit hours. Winter Quarter. Three lectures each week. Alternates biennially with Italian 608. Prerequisite, Italian 611. Mr. Moore.

Reading of The Inferno, Cantos 17-34, Purgatorio and Paradiso.

SPANISH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Introductory course in Spanish in addition to any prerequisites stated in the description of the courses.

605. **Advanced Composition and Conversation.** Three credit hours. Autumn Quarter. Three recitations each week. Mr. Gutierrez.

This course, conducted wholly in Spanish, is designed especially for prospective teachers and for persons desiring a practical command of the language. The subject matter will be, in large part, the geography and history of Spain and Spanish-America.

606. **Advanced Composition and Conversation (Continued).** Three credit hours. Winter Quarter. Three recitations each week. Prerequisite, Spanish 605. Mr. Gutierrez.

This course, conducted wholly in Spanish, is designed especially for prospective teachers and for persons desiring a practical command of the language. The subject matter will be, in large part, the geography and history of Spain and Spanish-America.

*607. **The Modern Spanish Novel.** Five credit hours. Winter Quarter. Five recitations each week. Given biennially, alternating with Spanish 609-610. Prerequisite, ten hours of advanced Spanish. Mr. Hendrix.

A careful study of the development of the modern Spanish novel, reading of representative authors. Lectures, collateral reading, and reports.

†608. **The Modern Spanish Novel (Continued).** Five credit hours. Five recitations each week. Given biennially, alternating with Spanish 609-610. Prerequisite, ten hours of advanced Spanish. Mr. Hendrix.

A careful study of the development of the modern Spanish novel, reading of representative authors. Lectures, collateral reading, and reports.

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* Not given in 1926-1927.

† Not given during the academic year, 1926-1927.

609. Romantic Drama and Poetry of the Nineteenth Century. Five credit hours. Winter Quarter. Five recitations each week. Given biennially, alternating with Spanish 607-608. Prerequisite, ten hours of advanced Spanish. Mr. Hendrix.

A survey of the movements in Spanish drama and poetry during the first half of the nineteenth century. Lectures, collateral reading, and reports.

610. Modern Spanish Drama. Five credit hours. Spring Quarter. Five recitations each week. Given biennially, alternating with Spanish 607-608. Prerequisite, ten hours of advanced Spanish. Mr. Hendrix.

A survey of the movements in Spanish drama and poetry during the second half of the nineteenth century. Lectures, collateral reading, and reports.

***611. Drama of the Golden Age.** Five credit hours. Autumn Quarter. Five recitations each week. Given biennially, alternating with Spanish 613-614. Prerequisite, ten hours of advanced Spanish. Mr. Anibal.

An intensive study of a limited number of plays of the representative dramatists. Lectures, collateral reading, and reports.

***612. Drama of the Golden Age (Continued).** Five credit hours. Winter Quarter. Five recitations each week. Given biennially, alternating with Spanish 613-614. Prerequisite, ten hours of advanced Spanish. Mr. Anibal.

An intensive study of a limited number of plays of the representative dramatists. Lectures, collateral reading, and reports.

613. Prose of the Golden Age. Five credit hours. Autumn Quarter. Five recitations each week. Given biennially, alternating with Spanish 611-612. Prerequisite, ten hours of advanced Spanish. Mr. Whatley.

A study of the prose of the period with especial emphasis on the novel. Lectures, collateral reading, discussion, and reports.

614. Cervantes. Five credit hours. Winter Quarter. Five recitations each week. Given biennially, alternating with Spanish 611-612. Prerequisite, ten hours of advanced Spanish, and consent of the instructor. Mr. Whatley.

A study of the works of Cervantes, with especial emphasis on the Quixote. Lectures, collateral reading, discussion, and reports.

615. Survey of Spanish Literature from the Earliest Times to the End of the Nineteenth Century. Five credit hours. Winter Quarter. Five recitations each week. Prerequisite, ten hours of advanced Spanish. Mr. Anibal.

Lectures, collateral reading, and reports.

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* Not given in 1926-1927.

616. Survey of Spanish Literature from the Earliest Times to the End of the Nineteenth Century (Continued). Five credit hours. Spring Quarter. Five recitations each week. Prerequisite, ten hours of advanced Spanish. Mr. Anibal.

Lectures, collateral reading, and reports.

617. Advanced Syntax. Three credit hours. Autumn Quarter. Three recitations each week. Prerequisite, ten hours of advanced Spanish and the consent of the instructor. Mr. Russell.

Study of syntax.

619. Sound: Laboratory Phonetics. Five credit hours. Autumr Quarter. Five recitations each week. Prerequisite, junior standing. Mr. Russell.

Study and analysis of sound in its physiological aspects. Training in the observation, recording and analysis of speech and in the correction of speech defects.

620. Spanish Phonetics. Five credit hours. Winter Quarter. Five recitations each week. Prerequisite, ten hours of advanced Spanish. Mr. Russell.

Careful and detailed study of special problems involved in teaching Spanish to English-speaking students. Laboratory analysis of differences between English and Spanish pronunciation.

625. The Spanish Ballad. Five credit hours. Spring Quarter. Five recitations each week. Prerequisite, ten hours of advanced Spanish. Mr. Whatley.

A study of the origins and the developments of the Spanish Ballad. Lectures, collateral reading, discussion, and reports.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 745.

ROMANCE LANGUAGES

FOR GRADUATES

Prerequisite for Graduate Work: For admission to all of the following courses the student must have at least four Quarters of collegiate work, five hours a week, each Quarter. Other prerequisites are stated in the descriptive material for each course.

Students intending to major in Romance Languages are urged to elect the following courses outside the department: History of France (History 624, 625), Introduction to the Study of the History of Language (Greek 701), the History of Philosophy (Philosophy 601-602), the History of Critical Theory (English 805), Roman and Comparative Literature (Latin 606), Latin 603, 604 (Advanced Reading). No student will be considered as a candidate for the M.A. degree unless his program includes at least two courses exclusively for graduates.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Introduction to Old French. Three credit hours. Autumn Quarter. Prerequisite, four years of collegiate French. Mr. Moore.

Old French phonology and morphology. Reading in the Chanson de Roland.

802. Introduction to Old French (Continued). Three credit hours. Winter Quarter. Mr. Moore.

***803. Old Provencal.** Three credit hours. Autumn Quarter. Prerequisite, four years of collegiate French. Mr. Moore.

Study of the language and literature of the Troubadours; Appel's Provenzalische Chrestomathie (Leipzig, 4th edition); Grandgent's Provencal Phonology and Morphology.

***804. Old Provencal (Continued).** Three credit hours. Winter Quarter. Prerequisite, four years of collegiate French. Mr. Moore.

Study of the language and literature of the Troubadours; Appel's Provenzalische Chrestomathie (Leipzig, 4th edition); Grandgent's Provencal Phonology and Morphology.

805. Old Spanish. Three credit hours. Autumn Quarter. Prerequisite, not less than three years of collegiate Spanish and the permission of the instructor in charge. Mr. Hendrix.

806. Old Spanish (Continued). Three credit hours. Winter Quarter. Prerequisite, not less than three years of collegiate Spanish and the permission of the instructor in charge. Mr. Hendrix.

***807. The French Romantic Novel.** Three credit hours. One Quarter. Prerequisite, three years of collegiate French and the permission of the instructor in charge. Mr. Havens.

A critical study with lectures, assigned readings, and reports, of Chateaubriand, Mme. de Staël, Hugo, Lamartine, Musset, Gautier, de Vigny, Sand, and others.

***808. French Romantic Drama.** Three credit hours. Autumn Quarter. Prerequisite, three years of collegiate French and permission of the instructor in charge. Mr. Havens.

A critical study with lectures, assigned readings, and reports, of Hugo, Musset, de Vigny, Dumas père, and others.

809. Research in French Language and Literature. Three to five credit hours. Autumn, Winter, Spring Quarters. Prerequisite, not less than four years of collegiate French and the permission of the instructor in charge. Mr. Moore, Mr. Havens, Mr. Rockwood.

This course is designed to meet the needs of individual graduate students who are pursuing a major study in the Department of Romance Languages.

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* Not given in 1926-1927.

810. Research in Spanish Language and Literature. Two to five credit hours. Autumn, Winter, Spring Quarters. Prerequisite, not less than three years of collegiate Spanish and the permission of the instructor in charge. Mr. Hendrix, Mr. Anibal, Mr. Russell.

This course is designed to meet the needs of individual graduate students who are pursuing a major study in the Department of Romance Languages.

811. Seminary in French Literature. Three credit hours. Winter Quarter. Prerequisite, three years of collegiate French and the permission of the instructor. Mr. Havens.

Studies in specific literary fields. The subject for 1926-1927 will be: Honoré de Balzac.

812. Seminary in French Literature (Continued). Three credit hours. Spring Quarter. Prerequisite, three years of collegiate French and the permission of the instructor. Mr. Havens.

Studies in specific literary fields. The subject for 1926-1927 will be: Flaubert and the Naturalistic Novel.

***813. Old French Literature.** Three credit hours. Spring Quarter. Prerequisite, French 601 or French 603. Mr. Moore.

Rapid reading of the Chanson de Roland, Aucassin et Nicolette, and the Lais of Marie de France.

814. Old French Literature. Three credit hours. Spring Quarter. Prerequisite, French 813. Mr. Moore.

Rapid reading of the Roman de Troie, the Tristan of Beroul, Cligès, the Roman de Renard, and selected Fabliaux.

815. Seminary in Spanish Literature. Three credit hours. Autumn, Winter, Spring Quarters. Lectures, readings, and reports. Prerequisite, three years of collegiate Spanish and permission of the instructor in charge. Mr. Hendrix, Mr. Anibal.

RURAL ECONOMICS

Office, 113 Townshend Hall

PROFESSOR FALCONER, ASSISTANT PROFESSORS LIVELY, McBRIDE, AND FOSTER, MR. MORISON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in rural economics in addition to any prerequisites stated in the description of the courses. Course 608 requires also an introductory course in sociology.

Graduate students majoring in this department will find it desirable to elect several courses in the College of Commerce and Journalism.

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* Not given in 1926-1927.

601. Accounts for Country Elevators and Marketing Organizations. Three credit hours. Spring Quarter. One lecture and two two-hour laboratory periods each week. Mr. Morison.

Accounts and business practice for country marketing associations.

602. Farm Cost Accounts. Three credit hours. Winter Quarter. Two lectures and one three-hour laboratory period each week. Mr. Falconer.

A study of systems of cost accounts in their application to the problems of farm organization and operation. The interpretation of cost figures.

603. Cooperation in Agriculture. Five credit hours. Winter Quarter. Five lectures each week. Mr. McBride.

A study of agricultural cooperation, mainly as found in the United States. The types of cooperative marketing, manufacturing and purchasing organizations, collective bargaining, cooperative credit and insurance.

***604. Land Tenure.** Three credit hours. Spring Quarter. Three lectures each week. Mr. Falconer.

Historical and comparative study of land tenure with special reference to the relation of the landlord and tenant to each other and to the land. A land policy for the United States.

605. The Agricultural Industry. Three credit hours. Winter Quarter. Three lectures each week. Mr. Falconer.

The importance of the agricultural industry to the welfare of the nation. Some characteristics of the farming industry. The maintaining of our agricultural output. Foreign competition present and prospective. State and federal regulation, encouragement and aid to agriculture in the United States and foreign countries.

†606. Sociology of Farm Folk. Five credit hours. Not open to students who have credit for Rural Economics 405. Mr. Lively.

A more comprehensive course than Rural Economics 405, designed to meet the needs of students who have had an acceptable course in sociology.

607. Rural Social Organization. Three credit hours. Autumn Quarter. Prerequisite, Rural Economics 606 or permission of the instructor. Mr. Lively.

The need of rural organization; the conditions and units of successful rural organization, including a study of rural group life; the family, neighborhood, and community; the agencies and methods of rural organization, including a survey of existing organizations, their scope and aims, characteristics of successful leadership, its source and training; forces which favor and retard rural organization. Readings, lectures, discussions, and investigations.

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* Not given in 1926-1927.

† Not given during the academic year, 1926-1927.

608. Rural Social Environment. Three credit hours. Winter Quarter. Prerequisite, Rural Economics 606 or 607. Mr. Lively.

A consideration of the viewpoint of rural people regarding rural social questions and reforms through a study of the avenues of rural expression. Relation of present rural organization to this outlook. Changing rural agencies and their effects upon viewpoint. Students should have a first-hand knowledge of country life and some knowledge of psychology.

NOTE: Attention is called to Sociology 816, Spring Quarter. Agricultural students who have had Rural Economics 607 will be admitted to this course by permission of the instructor in rural sociology. Such students will be directed by Mr. Lively in the methods of studying rural social problems.

612. Price of Farm Products. Three credit hours. Spring Quarter. Three lectures each week. Mr. Falconer.

A study of the prices of farm land and of farm products. Adjusting the farm business to meet price fluctuations.

613. The Distribution of Farm Products. Five credit hours. Autumn Quarter. Five lectures each week. Prerequisite, Economics 405 or Economics 401-402. Mr. McBride.

A study of the distribution of agricultural products, organized methods of marketing and prices.

This course is not open to students who have credit for Rural Economics 404.

614. Business Management in Agricultural Marketing. Three credit hours. Spring Quarter. Two lectures and one laboratory period each week. Mr. McBride.

A detailed study of representative agricultural marketing agencies, including their problems of administration, finance, selling, transportation and warehousing.

701. Special Problems. Three to fifteen credit hours, given in units of three or five hours a Quarter for one or more Quarters. Autumn, Winter, Spring Quarters. Prerequisite, at least eight hours of work in the department and the consent of the instructor. Mr. Falconer, Mr. Lively, Mr. McBride.

This course is for students who desire to work out special problems in the field of rural economics.

FOR GRADUATES

Prerequisite for Graduate Work: The prerequisite for graduate work in this department is an acceptable course in the principles of economics or sociology, and one year's study of farm management and agricultural economics or sociology.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Research Work and Seminary in Rural Economics. Three to six credit hours. Autumn, Winter, Spring Quarters. Opportunity is offered to carry on special research in agricultural economics and rural sociology. Mr. Falconer, Mr. Lively, Mr. McBride, Mr. Foster.

SCHOOL ADMINISTRATION

Office, Education Building

PROFESSORS McCRACKEN AND MORRISON, ASSISTANT PROFESSORS REEDER AND HECK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in school administration and one year of experience, in addition to any prerequisites stated in the description of the courses.

600. Fundamentals in School Administration. Three credit hours. One Quarter. Autumn, Winter, Spring. Three lectures each week. Prerequisite, for graduate credit one year of experience. Assigned readings All instructors.

Treatment of those fundamental problems in school administration which affect the teacher's welfare. Designed to give teachers a clearer understanding of the problems confronting the school administrator and of the teacher's part in solving them. Ohio school laws, regulations, and decisions.

This course is not open to students who have credit for School Administration 401, 402, 403, or 404.

601. Child Accounting. Three credit hours. One Quarter. Autumn, Winter, Spring. Three lectures each week. Assigned readings, investigations, and reports. Prerequisite, School Administration 600 and one year of experience. All instructors.

Compulsory education laws and working certificates of Ohio; main requirements in other states. Census—information it should secure, its use, legal requirements in different states. Attendance—organization of departments, amount and causes of non-attendance, devices to improve attendance. School record systems—forms used, items recorded, and uses. Reporting systems. Need of uniformity in recording and reporting systems. Age-grade-progress studies. Elimination, grading, and promotion. Classification. Definition of terminology. Visiting teacher. Marking systems.

604. Administration of the Curriculum. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings, investigations, and reports. Prerequisite, School Administration 600 and one year of experience. Open to students with permission of instructor in charge. Mr. Ashbaugh.

An examination of the experimental evidence bearing upon the administrative problems concerned with the curriculum. Placement of subject matter in the grades; program making for different types of schools; problems involved; regular and special subjects. Standard for selection of textbooks; administration of free textbooks.

605. The Teaching Corps. Three credit hours. Winter Quarter. Three lectures each week. Assigned readings and reports. Prerequisite, School Administration 600 and one year of experience. Open to graduate students with permission of instructor in charge. Mr. Reeder.

The preparation, appointment, tenure, assignment, and rating of teachers; training in service, professional activities and relation to school officials.

606. Building and Equipment. Three credit hours. Autumn Quarter. Three lectures each week. Assigned readings and reports. Prerequisite, School Administration 600 and one year of experience. Open to graduate students with permission of instructor in charge. Mr. McCracken.

A study of types of buildings, choice of site, construction and suitability for educational needs; a study of present-day equipment for school buildings. The use of score cards for rating buildings: rural, village and city. Standard for maintenance, repairs and janitorial service. Methods of studying efficiency of various types of service systems.

607. School Finance. Three credit hours. Winter Quarter. Three lectures each week. Assigned readings, investigations, and reports. Prerequisite, School Administration 600 and one year of experience. Open to graduate students with permission of instructor in charge. Mr. Reeder.

Present and potential sources of revenue; ability to support education; schemes of state aid; bases of distribution of state moneys; financial reports and surveys.

608. Business Management of Schools. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings, investigations and reports. Prerequisite, School Administration 600 and one year of experience. Open to graduate students with permission of the instructor in charge. Mr. Reeder.

Making the budget; payment for operation and maintenance of buildings; depreciation, insurance and bond issues; purchase and distribution of supplies; taking inventories; studies of unit costs; systems of accounting and bookkeeping; the business manager.

609. Extra-curricular Activities. Three credit hours. Winter Quarter. Three lectures each week. Assigned readings, investigations, and reports. Prerequisite, School Administration 600 and one year of experience. Mr. Morrison.

A study of those activities which fall outside of the group for which academic credit is ordinarily given. The relation of school administration to non-school community activities. Responsibility of the principal and superintendent for the school as a community center.

610. The Administration of Rural Education. Three credit hours. Autumn Quarter. Three lectures each week. Assigned readings, inves-

tigations, and reports. Prerequisite, School Administration 600 and one year of experience. Mr. McCracken.

An analysis of the problems of county and village superintendents; factors underlying rural school administrative problems; comparison of rural administrative problems in Ohio with those in other states.

611. State Administration of Education in the United States. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings, investigations, and reports. Mr. McCracken.

A comparative study of school administration in the various American states including such topics as federal and state policies, forms of control, revenue and its apportionment, the state and the teacher, the state and the child, the state and non-state education.

618-619-620. Minor Research Problems. Two to four credit hours. Autumn, Winter, Spring Quarters. Admission only on permission of the instructor and the chairman of the department. All instructors.

Investigation of minor problems in the various fields of school administration. A written report on the assigned problem will be required.

By permission of the head of the department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

***621-622-623. Proseminary (Teachers in Service).** Two credit hours. Autumn, Winter, Spring Quarters. Two lectures each week. Assigned readings and reports. Prerequisite, School Administration 600 and one year of experience. Open to superintendents, principals, and teachers in service by permission of the instructor in charge. Mr. Reeder, Mr. Heck.

Topics for study will be determined by the group within certain limits set by the department.

624. Administration of Standard Tests in Elementary Schools. Three credit hours. Autumn Quarter. Three lectures each week. Assigned readings and reports. Open to graduate students of experience with permission of the instructor in charge. Prerequisites, School Administration 600 and 643 and one year of experience. Mr. Morrison.

Selection of tests and organization of testing program for elementary schools; administrative problems involved in different types of schools and school systems; publicity and reports; use of data in formulating and evaluating administrative policies, remedial programs; the organization and work of bureaus of educational research.

This course is not open to students who have credit for School Administration 615.

625. Administration of Standard Tests in Secondary Schools. Three credit hours. Winter Quarter. Three lectures each week. Assigned readings and reports. Open to graduate students of experience

* 621 not given in 1926-1927.

with permission of the instructor in charge. Prerequisites, School Administration 600 and 643 and one year of experience. Mr. Morrison.

Selection of tests and organization of testing program for secondary schools; the use of mental and educational tests in classification, diagnosis, prognosis, and educational guidance; adaptations of organization, curricula and method to the educational needs of pupils of junior and senior high school age; recent investigations through the use of tests in the field of secondary education.

This course is not open to students who have credit for School Administration 615.

626. Administration of Health Education. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings, investigations and reports. Prerequisite, School Administration 600 and one year of experience. Mr. McCracken.

The place of health administration in school administration. Medical inspection; school nurse, dentist, and home visitor. Relation of school authorities to public health education. Hygiene of instruction; health of the teacher.

This course is not open to students who have credit for School Administration 602.

627. Administration of Vocational Education. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings, investigations and reports. Prerequisite, School Administration 600 and one year of experience. Open to graduate students with permission of instructor in charge. Mr. Horridge.

The administrative problems of vocational education, viewed from the angle of public school officials. Relation of vocational education to other types of education; national, state, and local organization and support of different types of vocational education; cooperative agreements and relationships; guidance and placement problems; types of curricula; costs; qualifications of instructors.

628. Administrative Problems of the Elementary School Principal. Three credit hours. Winter Quarter. Three lectures each week. Assigned readings and reports. Prerequisite, one year of experience and six hours of school administration. Open on permission of the instructor in charge.

An analysis of the work of the elementary school principal. The principal's relation to: the community, parents, pupils, building custodian, teachers, superintendent, supervisors, and other officials of the central office.

Different types of elementary schools—e.g., platoon, duplicate, departmentalized, three track system, graded mental levels.

Qualifications necessary for effective leadership.

Office routine, business management, supervision.

629. Administrative Problems of the Secondary School Principal. Three credit hours. Autumn Quarter. Three lectures each week. Assigned readings and reports. Prerequisite, one year of experience and six

hours of school administration. Open on permission of the instructor in charge.

An analysis of the work of the secondary school principal. The principal's relation to: community, parents, pupils, building custodian, teachers, superintendent, and other officials of the central office.

Study of the special administrative problems peculiar to different types of secondary schools—e.g., 4 year, 2-4 plan, 3-3 plan, and 6-year high school; also, such high schools as the cosmopolitan, the vocational, and the academic. Consideration of the special problems in administration of high schools in rural sections, villages, cities. Relation of high school to elementary school and to college; to the junior college as an extension of the secondary school.

†631. **Organization of the Junior High School.** Three credit hours. Six lectures each week. Assigned readings and reports. Prerequisite, one year of experience and six hours of school administration. Open upon permission of the instructor in charge.

A functional analysis of the work of the junior high school principal. Adaptation to school organization needed for attaining the objectives of the junior high school. The problems involved in junior high school organization in city and county school systems.

636. **School Publicity.** Two credit hours. Autumn Quarter. Two lectures each week. Assigned readings, investigations, and reports. Open to superintendents, principals and graduates of experience by permission of the instructor in charge. Prerequisite, six hours of school administration and one year of experience. Mr. Stevenson.

A study of both continuous and campaign publicity for schools through use of contests, exhibits, printed reports, newspapers, etc.; organization of publicity; means of securing support; the checking of results.

†640. **Administration of the Curriculum in the Elementary School.** Three credit hours. Assigned readings, investigations, and reports. Open on permission of the instructor in charge. Prerequisite, School Administration 600 and one year of experience.

An examination of the experimental evidence bearing upon the administrative problems concerned with the curriculum of the first six grades. Placement of subject matter in the elementary grades; program making for different types of schools; problems involved; regular and special subjects. Standards for selection of textbooks; administration of free textbooks.

Credit for both 604 and 640 will not be given.

†642. **Administration of the Curriculum in the Secondary School.** Three credit hours. Assigned readings, investigations, and reports. Open on permission of the instructor in charge. Prerequisite, School Administration 600 and one year of experience.

A treatment of the same topics as in School Administration 640, but with application to the upper six grades.

† Not given during the academic year, 1926-1927.

†643. **Educational Statistics: Elementary.** Three credit hours. Two lectures and one two-hour laboratory period each week. Not open to Freshmen and Sophomores. Mr. Heck.

A basic statistical course for students intending to conduct major or minor research. Frequency distributions; methods of measuring central tendencies and variability; construction of graphs and charts; interpretation of results in terms of probability; simple treatment of correlation.

This course is not open to students who have credit for Psychology 608 or School Administration 613.

NOTE: Students desiring to study statistics in the Autumn or Winter Quarter will elect Psychology 608 or 612.

†644. **Educational Statistics: Intermediate.** Three credit hours Two lectures and one two-hour laboratory period each week. Prerequisite, Psychology 608 or School Administration 613 or 643, or equivalent. Mr. Buckingham.

Fuller treatment of correlation; regression coefficients and equations; partial and multiple correlation; uses of normal probability curve; reliability and validity of test data; comparable measures.

This course is not open to students who have credit for Psychology 612.

NOTE: Students desiring to study statistics in the Autumn or Winter Quarter will elect Psychology 608 or 612.

FOR GRADUATES

Prerequisite for Graduate Work: Those desiring to do graduate work with school administration as either a major or minor subject must have not less than one year of satisfactory experience in educational service, in addition to three credit hours in school administration, and six credit hours in either psychology, sociology, economics, philosophy, history of education, or philosophy of education.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

†800. **The Preparation of Theses and Other Scientific Papers.** One credit hour. Open to graduate students with the permission of the instructor. Mr. Reeder.

Emphasizes how to prepare a thesis. The following topics, among others, are discussed: the scientific nature of the thesis; the selection, delimitation, and planning of the problem; the working bibliography; the collection of material; the organization and interpretation of material; the necessity for good English; the form of citations and footnotes; the preparation of statistical tables; the preparation of illustrations; the final bibliography; and suggestions on publication.

801. **Administration of Normal Schools and Colleges.** Three credit hours. Autumn Quarter. Three lectures each week. Assigned readings, investigations and reports. Open on permission of instructor in charge.

† Not given during the academic year, 1926-1927.

Prerequisite, one year of experience and nine hours of school administration.

An investigation of the various types of control, organization, and administrative policies as illustrated in selected colleges, universities, technical schools, junior colleges, normal schools, and normal colleges.

802. Seminary in School Administration. Two to five credit hours. Autumn, Winter, Spring Quarters. Open to superintendents, principals, and teachers of graduate standing by permission of the instructor in charge. Prerequisite, one year of experience and nine hours of school administration. All instructors.

A study of general administrative problems.

803. Ad Interim Projects. Two to five credit hours. Autumn, Winter, Spring Quarters. Open to superintendents, principals, and teachers of graduate standing who are in active service, by permission of the head of the department. Prerequisite, one year of experience and nine hours of school administration. All instructors.

Projects carried on by graduate students who have been enrolled previously in the department.

805-806-807. Major Research Problems. Three credit hours or more. Autumn, Winter, Spring Quarters.

Investigation of administrative problems leading to preparation of theses for advanced degrees.

By permission of the head of the department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

†810. Social Foundations of Public School Administration. Two to five credit hours. Six lectures each week. Assigned readings, investigations, and reports. Prerequisite, one year of experience and nine hours of school administration. Open upon permission of the instructor in charge.

This course is designed to magnify the school administrator as a leader in social problems of his community.

***812. Administration of National Systems of Education.** Three credit hours. Spring Quarter. Three lectures each week. Assigned readings, investigations, and reports.

A comparative study of school administration in the various foreign countries.

This course is not open to students who have credit for School Administration 612.

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* Not given in 1926-1927.

† Not given during the academic year, 1926-1927.

†815. **Seminary in County School Administration.** Two to five credit hours. Prerequisite, one year of experience and nine hours of school administration, including School Administration 610. Open upon permission of the instructor in charge. Mr. McCracken.

A study of the special problems in county school administration.

830. **Administrative Problems of the City Superintendent.** Three credit hours. Spring Quarter. Three lectures each week. Assigned readings and reports. Prerequisite, one year as principal or superintendent and nine hours of school administration. Open on permission of the instructor in charge.

An analysis of the work of the superintendent of city schools. A clearer definition of the working relationships that should exist between the superintendent and board of education, other municipal officials, state and county officials, the public, assistant or subordinate school officials and teachers. The social and legal status of the city superintendent.

Organization of city school systems: intermediate schools, summer schools, vocational schools, evening schools, junior colleges, community centers. Methods of securing cooperation with other public welfare agencies.

This course is not open to students who have credit for School Administration 630.

SOCIOLOGY

Office, 106 Commerce Building

PROFESSORS HAGERTY, NORTH, LUMLEY, MARK, AND MILLER, ASSISTANT PROFESSOR JONES, MR. DENUNE, MISS SPAETH, MR. WANG, MR. WHEELER, MR. PATERSON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in sociology in addition to any prerequisites stated in the description of the courses.

601. **The Family.** Four credit hours. One Quarter. Winter and Spring. Mr. Denune, Miss Spaeth.

A study of the matrimonial institutions and family organization in the different stages of social development—primitive, Greek, Roman, medieval, modern. The modern family, its functions and problems.

605. **The Immigrant.** Four credit hours. Winter Quarter. Mr. Miller.

A study through the various immigrant groups of social attitudes resulting from political, religious, economic, and social relations of groups. The psychological and practical problems of adjustment. General principles of group relationship rather than specific methods of procedure.

† Not given during the academic year, 1926-1927.

607. The Race Problem. Four credit hours. Autumn Quarter. Mr. Miller.

Survey of contemporary and potential race contacts and conflicts throughout the world. Development of race consciousness. Relations of Caucasians, Negroes, Indians, and Mongolians in the United States.

609. Adjustment of Alien Groups. Four credit hours. Spring Quarter. Four meetings each week. Prerequisites, Sociology 605 and 607, or special permission of the instructor. Mr. Miller.

Educational methods, legal enactments, case studies, special programs, objectives in dealing with foreign-born and non-white groups in America.

618. Poverty. Three credit hours. Autumn Quarter.

Extent, nature and causes of poverty. Outlines of a program of prevention. The relation of the standard of living to social welfare. The relation of minimum wage laws to poverty.

619. Social Treatment of Dependents. Three credit hours. Winter Quarter. Miss Jones.

Principles and methods underlying public and private agencies in aiding needy families living in their own homes. Mothers' pensions. Medical social work. Nature, extent and causes of dependency. Treatment of the mentally and physically handicapped, the blind, deaf, crippled, epileptic, feebleminded, homeless and aged. Visits to state and other institutions for the care of these groups.

620. Social Treatment of the Child. Three credit hours. Spring Quarter. Miss Jones.

Principles and methods of caring for dependent and neglected children in their own homes, in foster homes, and in institutions. Protective work for the maladjusted and problem child.

621. The Child and the Community. Three credit hours. One Quarter. Autumn and Spring. Miss Spaeth.

The family as a social institution, its historical development and present status. Modern conditions affecting home life. The child as affected by economic and social factors outside the home. The dependent and the neglected child. Social legislation affecting the child. Social responsibility toward the child.

Open only to students in Home Economics who do not have credit for Sociology 601 or 617.

625. The Criminal. Three credit hours. Spring Quarter. Three meetings each week. Mr. Hagerty.

The social, economic, and physiological causes of crime. The changing character of crime as modified by the legal code. Types of criminals, the instinctive, habitual, professional, etc. The classical and positive schools of criminology. The relation of feeble-mindedness and degeneracy to crime. Juvenile crime, its causes and prevention.

626. Penology. Three credit hours. Autumn Quarter. Three meetings each week. Prerequisite, Sociology 625. Mr. Hagerty.

The evolution of the methods of criminal procedure with an analysis and criticism of present-day methods. The organization and administration of penal institutions. As visits will be made to courts, jails, and prisons, students who take this course should be free to make these visits Saturday mornings.

627. Penology. Three credit hours. Winter Quarter. Three meetings each week. Prerequisite, Sociology 626. Mr. Hagerty.

The Juvenile Court, its organization, and the legal procedure it introduces. The indeterminate sentence, probation and parole. The individual treatment of delinquents.

635-636-637. Social Statistics. Three credit hours. Autumn, Winter, Spring Quarters. Two lectures and two hours of laboratory or field work each week. Miss Mark.

The application of statistical methods to social research; collecting, arranging, and interpreting statistical data. Schedules; tables; averages and ratios; graphic presentation. A study of the fields of population and vital statistics, dependency, delinquency, and standard of living.

645. Leisure and Recreation. Four credit hours. Autumn Quarter. Four meetings each week.

The sources of leisure in early and modern society. The social significance and uses of leisure. The social functions of play. Historical aspects of play. The recreation problem of modern communities from the standpoint of control and of public provision.

646. Social Organization and Administration of Recreation Facilities. Four credit hours. Winter Quarter. Four meetings each week. Prerequisite, Sociology 645.

Methods and means of control of commercialized recreation with special reference to American cities and towns. The promotion and organization of public and semi-public agencies. The administrative control of playgrounds, social centers, clubs, and other non-commercialized agencies. The coordination of the recreation facilities of the community.

***650. Boys' Work Organization.** Four credit hours. Autumn Quarter. Prerequisites, Sociology 645 and 646. Mr. .....

A study of the organization and methods of work of the principal agencies engaged in boys' work, such as the Boy Scouts, Young Men's Christian Association, Settlement Clubs for Boys. The principal part of the instruction will be given by specialists from the various agencies. Practical field work with some one of the agencies during the course will be required.

651. Girls' Work Organization. Four credit hours. Spring Quarter. Prerequisites, Sociology 645 and 646. Mr. .....

A study of the plan of organization and methods of work of the principal agencies engaged in girls' work, such as the Girl Scouts, Camp Fire Girls, Young Women's Christian Association, Settlement Clubs for Girls. The principal part of the instruction will be given by specialists from the various agencies. Practical field work with some one of the agencies during the course will be required.

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* Not given in 1926-1927.

652. Administration of Social Settlements, Community Houses, School Centers. Three credit hours. Winter Quarter. Mr. Wheeler.

Methods of organizing. Determination and development of programs. Personnel and executive factors. Financing, business methods. Publicity, reports, and records. One hour of practice work in settlements and community houses.

655. Municipal Sociology. Four credit hours. Autumn Quarter. Four meetings each week. Mr. Denune.

The place of the city in social organization. Comparison of the ancient, medieval, and modern city. Causes of growth of modern cities. Composition of urban population. Racial, cultural, and economic groupings of population. Problems of city planning, housing, health, intellectual, and aesthetic satisfaction. Control of vice and crime. Agencies for the cultivation and expression of civic interest.

656. Rural Social Institutions. Four credit hours. Winter Quarter. Four meetings each week. Mr. Denune.

The problems of health, recreation, social intercourse, housing, child welfare, dependency, defectiveness, and delinquency in American rural communities and small towns. The agencies and organizations dealing with these problems.

657. Welfare Problems in Rural Communities. Four credit hours. Spring Quarter. Four recitations each week. Prerequisite, Sociology 656 or Rural Economics 606. Mr. Denune.

The relation of the school, the church, the Christian Associations, recreational societies, relief agencies, and the Juvenile Court to welfare problems in rural communities and small towns. A consideration of recreation, social intercourse, health, child welfare, dependency, defectiveness, and delinquency. This course is designed to give the rural teachers, ministers, and social workers a knowledge of the welfare problems which exist in rural communities and the methods by which they are being approached by rural workers.

†661. Social Welfare Organization. Two credit hours. Open to graduate students and undergraduates of the College of Commerce and Journalism of approved experience in social work. Not open to Freshmen and Sophomores.

An examination of the principal social welfare agencies; public and private, from the standpoint of their historical development, function, social philosophy and form of organization. Special attention given to the following movements: state care of the poor, charity organization societies, social settlements, the Juvenile Court, probation and parole, child welfare agencies, health agencies, recreation organization, social work of the church and allied organizations, the relation of public and private agencies, theory of community organization.

This course is not open to students who have credit for Sociology 811 or 812.

†663. The Administration of Social Welfare Federations. Six credit hours. Open to graduate students and undergraduates of the Col-

† Not given during the academic year, 1926-1927.

lege of Commerce and Journalism of approved experience in social work. Not open to Freshmen and Sophomores.

The organization of councils of social agencies; the development of federation movements and the organization of financial federations; the importance of financial federations in the development of social welfare; the problems of financing social agencies, financial campaigns, budget making and other sources of support to social agencies such as endowments, state subsidies, support from foundations, etc.; office organization and management; educational publicity; administration of various types of social agencies.

665. **Social Order and Social Control.** Three credit hours. Autumn Quarter. Three recitations each week. Textbooks, lectures, papers, and discussions. Mr. Lumley.

The social order, its nature, its varieties, its origin; the agencies of social control, such as custom, conventionality, social suggestion, public opinion, law, education, religion, art, ceremony, ideals, personality. Additional readings for graduate credit.

666. **Social Evolution.** Three credit hours. Winter Quarter. Three recitations each week. Textbooks, lectures, papers, and discussions. Mr. Lumley.

A systematic review of primitive social organization; the forms and development of industry, marriage and the family, the arts of gratification, religion, government; the fact of social evolution; the methods of social evolution such as variation, selection, transmission, adaptation. Additional readings for graduate credit.

667. **Social Progress.** Three credit hours. Winter Quarter. Three recitations each week. Textbooks, lectures, papers, and discussions. Mr. Lumley.

A study of the various theories and the criteria of social progress. Extra readings for graduate credit.

668. **Community Organization.** Three credit hours. Autumn Quarter. Mr. North.

An analysis of the social problems with which the local community has to deal, their interrelations and their sources in local conditions. Local community agencies and methods of coordinating their resources.

670-671. **Community Health Organization.** Three credit hours. Winter and Spring Quarters. Open only to Seniors in Social Administration and to graduate students. Mr. Paterson.

Methods of organization. Determination and development of programs and budgets. Administrative problems. Relation of voluntary and official health organizations.

675. **Field Work in Sociology.** Six to twelve credit hours. One Quarter. Autumn, Winter, Spring. Open to graduate students by permission of the instructor.

Practical work in the fields of family and child welfare, penology, health, industry, or recreation under the supervision of organizations in these fields and the instructor.

695-696. Social Case Work. Three credit hours. Winter and Spring Quarters. Open to graduate students by permission of the instructor.

A critical analysis of the technique and methods of social treatment, with particular reference to family service, dependent and neglected children, juvenile delinquents, medical social work. Record writing and analysis.

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

***801-802-803. History of Sociological Thought.** Two credit hours. Autumn, Winter, Spring Quarters. One session each week. Readings, reports, lectures, and discussions. Open only to graduate students. Mr. Lumley.

A survey of the most important literature of sociological theory, preceded by an examination of the writings of the Utopians, the philosophers of history and the social reformers.

805-806-807. American Sociological Theory. Two credit hours. Autumn, Winter, Spring Quarters. One session each week. Readings, reports, lectures, and discussions. Open only to graduate students. Mr. Lumley.

An intensive study of the theories concerning the origin, development, forms and nature of society, advanced by the leading American sociologists.

809-810. Research in Social Control. Two credit hours. Winter and Spring Quarters. Open only to those who have had Sociology 665 and ten hours of psychology. Mr. Lumley.

This course is a continuation of Sociology 665, and will consist of individual study of two or more methods of social control under the supervision of the instructor.

811-812. Modern Social Welfare Movements. Four credit hours. Autumn and Winter Quarters. Mr. North.

A critical examination of the historical development of organization for social welfare, its underlying social philosophy, and the agencies that have been developed. The theory and practice of governmental action for social welfare. Voluntary agencies, their field and function and relation to public agencies. State supervision. The public school as an agency of social welfare.

815. The Community. Four credit hours. Spring Quarter. Mr. North.

The development of the conception of the local community as the unit for social welfare organization. Relation of the local community to state and national units. Types of communities. The social problems and the social forces and resources of the local community. Types and methods of community organization. Field studies of particular communities.

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* Not given in 1926-1927.

816. Community Surveys. Four credit hours. Spring Quarter. Prerequisites, Sociology 635, 636, 637. This course must be accompanied by Sociology 815. Miss Mark.

Methods and technique of studying the social life of communities. Practice work in planning and executing field studies.

Students taking this course must be prepared to bear the expense of making their field studies outside of Columbus.

817-818-819. Research in the Field of Human Migrations. One to four credit hours. Autumn, Winter, Spring Quarters. Mr. Miller.

821-822-823. Graduate Seminary. Two credit hours. Autumn, Winter, Spring Quarters. All instructors.

Graduate students and the instructors in the department will meet regularly for the presentation of the results of investigations, the review of current sociological literature, and the discussion of current problems.

824. Research in the History and Organization of Social Welfare Activities. One to four credit hours. Mr. North.

831-832-833. Administration of Social Agencies. Four credit hours. Autumn, Winter, Spring Quarters. Mr. West.

A study of the backgrounds of social work; the development of federation movements and the organization of financial and non-financial councils of social agencies; confidential exchanges; endorsement committees; the problems of financing social agencies, endowments, foundations, community chests, state subsidies, financial campaigns, and budget making. Office and personnel efficiency; education publicity including the application of the laws of salesmanship to social service; the administration of the various types of social agencies, public and private.

841-842-843. Research in Social Statistics. One to three credit hours. Autumn, Winter, Spring Quarters. Open to graduate students who have had statistical training, upon the consent of the instructor. Miss Mark.

Individual study in some field of statistical investigation under the direction of the instructor.

845-846. Methods of Sociological Investigation. Three credit hours. Autumn and Winter Quarters. Required for candidates for advanced degrees in sociology who have not had equivalent work. Miss Mark.

A course designed to prepare students to do independent social research.

This course is not open to students who have credit for Sociology 685-686-687.

SOILS

Office, 203 Townshend Hall

PROFESSOR BEAR, ASSISTANT PROFESSORS CONREY AND McCLURE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in soils in addition to any prerequisites stated in the description of the courses.

601. Theory and Practice in Soil Management. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Bear.

A review of some of the more important investigational work which has been and is now being done with soils as related to field practice.

602. Chemical Analysis of Soils. Five credit hours. Winter Quarter. Two lectures and three three-hour laboratory periods each week. Mr. McClure.

A complete analysis of a soil with training in the more refined analytical procedures as applied to soils.

603. Origin and Classification of Soils. Three credit hours. Spring Quarter. Two lectures and one three-hour laboratory period each week. Mr. Conrey.

The characteristics of soils and their significance with special reference to Ohio. Laboratory work in soil mapping, field trips to the experimental farm at Wooster and to several substation farms.

604. Physico-Chemical Analysis of Soils. Five credit hours. Autumn Quarter. Two lectures and three three-hour laboratory periods each week. Prerequisites, Soils 602 or an acceptable course in quantitative analysis, and a course in physics. Mr. McClure.

A study of the soil as a physico-chemical system; colloids absorption, soil solution, reaction velocities employing freezing point, conductivity, hydrogen electrode, spectroscope, and other physico-chemical methods.

605. Bio-Chemical Analysis of Soils. Three credit hours. Spring Quarter. Three three-hour laboratory periods each week. Mr. Bear.

A chemical study of oxidation, reduction, and carbonation processes in soils. Opportunity will be given properly qualified students to take up minor research problems in any phase of these processes.

701. Special Problems. Three to fifteen credit hours. May be taken in units of three to five credit hours for one or more Quarters. Autumn, Winter, Spring Quarters. Prerequisite, two courses in soils. Mr. Bear, Mr. Conrey, Mr. McClure.

Special problems in any phase of soils in which the student may be interested.

FOR GRADUATES

Prerequisite for Graduate Work: Students expecting to major in soils are urged to elect additional courses in general chemistry, qualitative and quantitative analysis, and organic chemistry. In addition to the above, courses in bacteriology, plant physiology, and physical chemistry are suggested.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801. Research in Soils. Five credit hours. Autumn, Winter, Spring Quarters. Mr. Bear, Mr. Conrey.

Opportunity will be given to students who have had satisfactory preliminary training, to carry on library, field, greenhouse, or laboratory research along physical, chemical, or biological lines as related to soils.

802. Soil Seminary. One credit hour. Autumn, Winter, Spring Quarters. Mr. Bear.

A weekly conference of graduate students and departmental members in which the research work of members of the seminary or related topics will be discussed.

SPANISH

(See Romance Languages and Literatures)

VETERINARY MEDICINE

Office, 103 Veterinary Laboratory

PROFESSORS WHITE AND GOSS, ASSISTANT PROFESSOR REBRASSIER, MR. HENDERSHOTT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

621. Pathology Technique. Two or five credit hours. All Quarters. Laboratory work, three hours for each credit hour. Mr. Goss, Mr. Rebrassier, Mr. Hendershott.

Practice in the methods of laboratory diagnosis.

This course is not open to students who have credit for Veterinary Medicine 821.

622. Advanced Special Pathology. Two or five credit hours. All Quarters. Laboratory work, three hours for each credit hour. Prerequisite, Veterinary Medicine 621. Mr. Goss, Mr. Rebrassier, Mr. Hendershott.

A course in the pathology of infectious diseases with special reference to anatomical lesions and methods of diagnosis.

FOR GRADUATES

Prerequisite for Graduate Work: The required training in pathology and the permission of the instructor.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

822. **Special Anatomical Pathology.** Five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Goss, Mr. Rebrassier, Mr. Hendershott.

The gross and microscopical changes of pathological lesions of special regions are carefully considered.

823. **Special Bovine Pathology.** Five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Goss, Mr. Rebrassier, Mr. Hendershott.

The genital organs of the cow are studied with special regard to the causes and changes occurring during pregnancy and in sterility.

824. **Special Pathology Problems.** Five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Goss, Mr. Rebrassier.

This course is intended to accommodate students who have special problems upon which they wish to do further work.

825. **Special Poultry Pathology.** Five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Goss, Mr. Rebrassier.

This course permits the study of the diseases of fowls, with regard to the causes, lesions, and diagnostic methods.

VOCATIONAL EDUCATION

Office, Education Building

PROFESSORS HORRIDGE AND STONE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: The permission of the instructor in charge.

602. **Principles of Part-time Education.** Two credit hours. Autumn Quarter.

An introductory course consisting of a study of types of part-time education and the aims and purposes of each.

604. **Bases of Vocational Education.** Two credit hours. Winter Quarter. Two recitations each week. Mr. Horridge.

Consideration of the vocational education movement with respect to the agencies that have played important parts in its development.

†605. Principles of Commercial Education. Three credit hours. Three recitations each week.

For teachers or prospective teachers of commercial subjects in junior or senior high schools. Topics considered: meaning, purpose and scope of commercial education in secondary schools; importance of and procedure in making occupational surveys in the field of commercial education.

606. Principles of Vocational Guidance. Three credit hours. Spring Quarter. Mr. Stone.

An inquiry as to the origin, development, meaning, scope, purposes, and methods of vocational and educational guidance.

607. Vocational Counseling. Two credit hours. Winter Quarter. Two recitations each week. Prerequisite, Vocational Education 606. Mr. Stone.

A consideration of the supervisional and administrative problems connected with vocational guidance and placement. Counseling with pupils, parents, and employers.

Survey of vocational guidance material and of the teacher's technique in the use of this material; educational, selective, trade and intelligence tests.

†610. Organization and Management of Day Industrial Schools. Two credit hours. Two recitations each week. Mr. Horridge.

Organization of courses of instruction; types of buildings; equipment; selection, training, and supervision of instructors; costs; records and certification in relation to the day industrial school.

*611. Organization and Management of Evening Industrial Schools. Two credit hours. One Quarter. Two recitations each week. Mr. Horridge.

Organization of courses of instruction; types of buildings; equipment; selection, training, and supervision of instructors as related to the evening industrial school.

612. Organization and Management of Part-time Schools. Two credit hours. Winter Quarter. Two recitations each week.

A study of the organization and management of general continuation schools and of part-time trade extension schools, both compulsory and cooperative.

620-621-622. Minor Problems. Two to four credit hours. Autumn, Winter, Spring Quarters. Prerequisite, special permission of the instructor. Mr. Horridge, Mr. Stone.

Investigation of minor problems in vocational education and vocational guidance.

By permission of the head of the department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

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* Not given in 1926-1927.

† Not given during the academic year, 1926-1927.

ZOOLOGY AND ENTOMOLOGY

Office, 101 Botany and Zoology Building

PROFESSORS OSBURN, OSBORN (RESEARCH), BARROWS, KRECKER, AND DeLONG, ASSOCIATE PROFESSOR HINE, ASSISTANT PROFESSORS KENNEDY AND KOSTIR

ZOOLOGY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in zoology. Courses 605, 606, 607, 615, 616, and 617 require also two additional Quarters of biological science.

601-602-603. Advanced Studies in Animal Heredity. Three credit hours. Autumn, Winter, Spring Quarters. One lecture and two laboratory periods each week. Mr. Barrows.

A portion of this course will be devoted to the study of recent advances in the field of animal heredity, but a large part of the work will consist in the breeding of animals in the laboratory and the analysis of data collected.

604. Animal Ecology. Five credit hours. Spring Quarter. Two lectures and three two-hour periods of laboratory or field work each week. Mr. Krecker.

An introduction to the study of animals in their natural surroundings which will include ponds, streams, fields, and woodlands. Animal associations and the various factors which affect animals in relation to their environment are considered.

This course is recommended to students who expect to teach biology. Students who desire to continue the subject may take up some particular phase of the work and should register in Zoology 700-701-702-703.

605-606-607. Animal Behavior. Three or five credit hours for one or more Quarters. Autumn, Winter, Spring Quarters. One lecture each week and the remainder laboratory work. Recommended to students in psychology. Mr. Barrows.

Devoted to a study of the functions of the various parts of the nervous systems of the invertebrates and vertebrates, with emphasis on the mechanics of adjustment to heat, light, chemical, and mechanical stimulation. Considerable time will be spent on experiments with living worms and insects.

615-616. Advanced Zoology of Invertebrates. Five credit hours. Autumn and Winter Quarters. Two lectures and three two-hour laboratory periods each week. Lectures, laboratory exercises and occasional field trips. Mr. Kostir.

A study of the structure, life histories, habits, and relationships of invertebrate animals, together with the consideration of important biological principles. Especially recommended as a fundamental course for students specializing in biological science.

This course is not open to students who have credit for Zoology 405-406.

617. Cellular Biology. Five credit hours. Spring Quarter. Three lectures and two laboratory periods each week. Mr. Kostir.

A study of the organization and activities of the living cell. Special attention will be given to the results of the investigation of unicellular organisms.

***620. Evolution of the Animal Groups.** Five credit hours. Spring Quarter. Prerequisites, Zoology 409 (Evolution) and one Quarter of comparative anatomy or equivalent. Mr. Osburn.

The principles of evolution as applied to the origin and relationships of various animal groups with special emphasis on the advancement shown by the vertebrate classes from fishes to mammals.

701-702-703. Special Problems. Three or five credit hours each Quarter. Autumn, Winter, Spring Quarters. A student may enter at the beginning of any Quarter. Prerequisite, Zoology 615-616 or an acceptable course in economic entomology or equivalent.

After conference with the professor in charge, the subject for investigation may be selected in one of the following: animal reactions, heredity, arachnology (Mr. Barrows); animal ecology (Mr. Krecker); protozoology, cellular biology (Mr. Kostir); ichthyology (Mr. Osburn); apiculture (Mr. Hine); life history development, morphology, classification or some other phase of zoological or entomological study (various professors).

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Principles of Education, Course 705.

FOR GRADUATES

Prerequisite for Graduate Work: Students expecting to major in this department must be familiar with the elements of related sciences, and must have had at least two years of work in zoological subjects. It is desirable also that the student should have a reading knowledge of French and German.

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Seminary in Zoology. One credit hour. Autumn, Winter, Spring Quarters. Mr. Osburn.

Discussion of assigned subjects, reports on research work, current literature, etc. All graduate students in the department are expected to register in this course as long as they are in residence.

805-806-807. Invertebrate Zoology. Five credit hours. Autumn, Winter, Spring Quarters. Mr. Osburn.

A detailed study of invertebrate groups with special reference to morphologic features and discussions of their significance in adaptation, phylogeny, and taxonomy.

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* Not given in 1926-1927.

808-809. Invertebrate Embryology. Three or five credit hours. Autumn and Winter Quarters. Lectures, reading, and laboratory. Prerequisites, the equivalent of Entomology 651-652 and 656, or Zoology 805-806-807. Mr. Osburn.

811-812-813. Research Work. Subject to be chosen after consultation. Three to ten credit hours each Quarter. Offered every Quarter and may be repeated as often as is necessary in pursuit of special research. Mr. Osburn, Mr. Osborn, Mr. Hine, Mr. Barrows, Mr. Krecker, Mr. DeLong, Mr. Kennedy, Mr. Kostir.

Problems in development, life history, morphology, ecology, genetics, animal behavior, parasitology, taxonomy, or other zoological or entomological subjects may be undertaken. For some of these the opportunities are particularly good at the Biological Laboratory. Students interested should send for the Franz Theodore Stone Laboratory Bulletin.

ENTOMOLOGY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

Prerequisite for All Courses in This Group: Fundamental courses in zoology and entomology in addition to any prerequisites stated in the description of the courses.

651-652. Advanced Entomology. Five credit hours. Autumn and Winter Quarters. Two lectures and three two-hour laboratory periods each week. Mr. Kennedy.

Advanced entomology for those wishing to investigate some special group of insects or to fit themselves for professional work in entomology.

Entomology 651 deals with the comparative external morphology, the evolutionary history and classification of insects; laboratory work is systematic and material will be furnished, but it will be preferable if the student collects and pins material for himself during the summer preceding.

Entomology 652 deals with insect behavior, life histories, and particularly with ecological principles governing occurrence and distribution of insect species, and the principles underlying insect control.

653-654. Insect Control. Five credit hours. Autumn and Spring Quarters. Two lectures and three laboratory periods each week. Mr. DeLong.

Principles of economic entomology, utilization of parasitic and predaceous forms, entomophagous fungi and bacteria, circumvention and exclusion, cultural methods, traps and trap crops, heat, animal dips, insecticides, insecticide machinery, and accessories, and practical work in fumigation, spraying, inspecting, preparing an entomological exhibit and a collection of economic insects, rearing and insectary methods. Practical course intended to anticipate, so far as possible, the requirements and difficulties which the student will encounter in state or federal entomological work.

655. Medical and Veterinary Entomology. Five credit hours. Winter Quarter. Three lectures and two laboratory periods each week. Given biennially. Mr. DeLong.

The insects, mites, and ticks which cause or transmit diseases of man and domestic animals; the sources of infection, methods of transmission and interrelation with pathogenic bacteria and protozoa; the relations of the subjects to parasitology, bacteriology, veterinary medicine, sanitary engineering and public health; field observations of unsanitary conditions, practice in feeding, breeding and handling experimental insects, and practical problems in the control of parasites and insect-borne diseases.

The student is advised if possible to take Zoology 404 before electing this course.

656. Morphology and Development of Insects. Five credit hours. Autumn Quarter. Two lectures and three two-hour laboratory periods each week. Mr. Kennedy.

An advanced comprehensive course on the internal structures of insects, together with what is known of their functions; morphology, histology, histogenesis, embryology, and metamorphosis. The laboratory work is usually handled as a special research problem for each student. To be sure of proper material, the student, when possible, should have a problem assigned at the end of the Spring Quarter.

This course parallels the work of Entomology 454-455 and 651-652, with emphasis on internal structures and functions.

701-702-703. Special Problems. Three or five credit hours each Quarter. Autumn, Winter, Spring Quarters. A student may enter at the beginning of any Quarter. Prerequisite, Zoology 615-616 or an acceptable course in economic entomology or equivalent.

After conference with the professor in charge, the subject for investigation may be selected in one of the following: animal reactions, heredity, arachnology (Mr. Barrows); animal ecology (Mr. Krecker); protozoology, cellular biology (Mr. Kostir); ichthyology (Mr. Osburn); apiculture (Mr. Hine); life history development, morphology, classification or some other phase of zoological or entomological study (various professors).

FOR GRADUATES

An undergraduate student shall not be permitted to take any course in the "800" group except by permission of the Graduate Council.

801-802-803. Seminary in Entomology. One credit hour. Autumn, Winter, Spring Quarters. Mr. Osburn.

Discussion of assigned subjects, reports on research work, current literature, etc. All graduate students in the department are expected to register in this course as long as they are in residence.

811-812-813. Research Work. Subject to be chosen after consultation. Three to ten credit hours each Quarter. Offered every Quarter and may be repeated as often as is necessary in pursuit of special research. Mr. Osburn, Mr. Osborn, Mr. Hine, Mr. Barrows, Mr. Krecker, Mr. DeLong, Mr. Kennedy, Mr. Kostir.

Problems in development, life history, morphology, ecology, genetics, animal behavior, parasitology, taxonomy, or other zoological or entomological subjects may be undertaken. For some of these the opportunities are particularly good at the Biological Laboratory. Students interested should send for the Franz Theodore Stone Laboratory Bulletin.